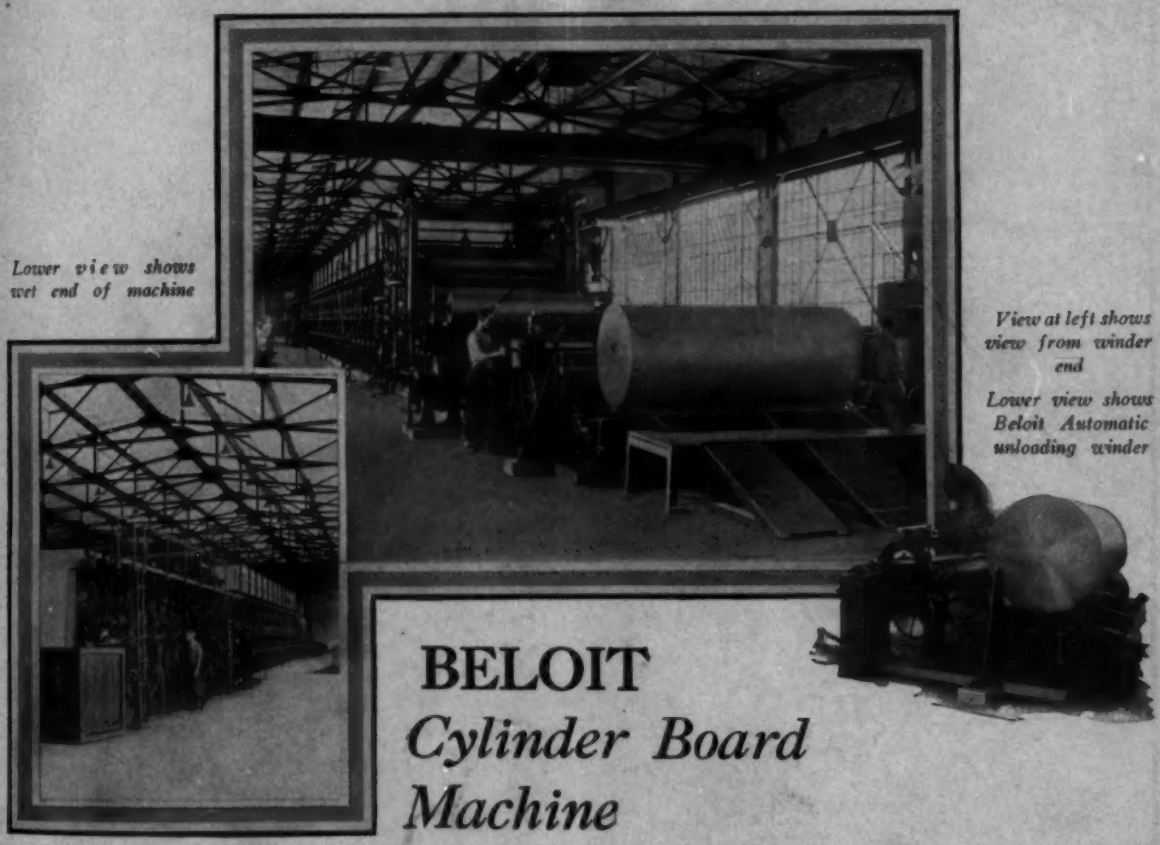
MAY 8 1928

PAPER TRADE JOURNAL

Vol. LXXXVI, No. 18 MAY 3, 1928

United States, Per Annum. $4 00
Canada and Foreign Countries in Postal Union. $6 00

Lower view shows wet end of machine



View at left shows view from winder end

Lower view shows Beloit Automatic unloading winder

BELOIT
Cylinder Board Machine

THE Beloit High-Speed Cylinder Board Machine illustrated is doing yeoman service in the Louisiana mill of the International Paper Co. at Bastrop, La. It is modernly equipped throughout. The view shown in left illustration is from the wet end of the machine, the center view is taken from the winder end.
The small view at right shows a close-up of the Beloit automatic or self-unloading winder, a most unusual installation on the end of a board machine. Note the full roll of board ready to be discharged. The back drum of the winder is raised by means of a motor and automatically pushes the finished roll over the front drum and onto the loading platform. All bearings on winder are completely enclosed Timken bearings.

Today's Needs Require Modern Machinery

BELOIT IRON WORKS, BELOIT, WIS., U. S. A.

That Intangible *Something*

IN E B G Liquid Chlorine you receive more than a quality product. You gain more than the satisfaction experienced whenever a product is well serviced.

It is difficult to adequately convey it in words... this intangible something which each and every E B G customer receives. Yet there is nothing misty or unreal about the benefits derived from EBG Liquid Chlorine and the service which accompanies it.

Back of the product and the service is real, intelligent interest and cooperation... the spirit of EBG which invests your contacts with profit and a feeling of complete satisfaction.

Liquid EBG Chlorine

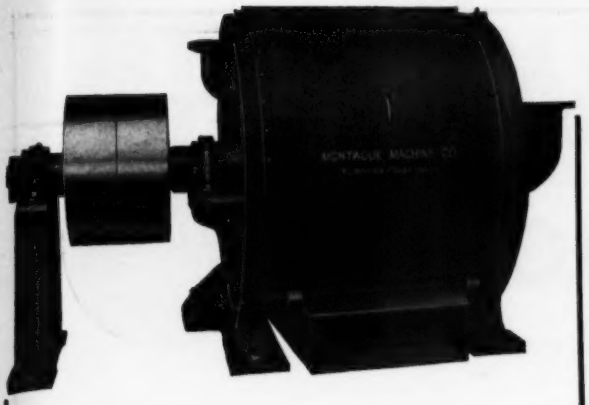
Electro Bleaching Gas Co.

PIONEER MANUFACTURERS of LIQUID CHLORINE

Plant: NIAGARA FALLS, N.Y.

Main office 9 East 41st Street New York

Entered as second class matter August 13, 1925, at the Post Office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. — ESTABLISHED 1872 — FIFTY-SIXTH YEAR — Published every Thursday by the Lockwood Trade Journal Co., at 14 N. Crystal St., E. Stroudsburg, Pa. EXECUTIVE AND EDITORIAL OFFICES: 10 East 39th STREET, NEW YORK CITY. CHICAGO, 123 West Madison Street, Chicago, Ill.



The Montague Screen

Patent applied for.

The Ideal Screen for Tailings

The normal capacity of this Screen on either groundwood or sulphite tailings is 25-30 tons per day at a consistency of 0.4% or less but the screen handles higher consistencies such as might be furnished it at times in practice to correspondingly good advantage and the rejections are thoroughly well washed.

Full particulars upon request.

The Montague Machine Co.
TURNERS FALLS, MASS.

PAPER TRADE JOURNAL
ESTABLISHED 1872

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

FIFTY-SIXTH YEAR

Published Every Thursday by the
LOCKWOOD TRADE JOURNAL CO., Inc.

GEO. S. MACDONALD, President — F. K. HOPPIE, Secretary

Executive and Editorial Offices, 10 East 39th Street, New York
Chicago Office: Room 14, Suite 410, 123 West Madison St.

TABLE OF CONTENTS

Copyright, 1928, by Lockwood Trade Journal Co., Inc.

Cites Advantages of Deal with I. P. Co. 27
Plan for Large Imports of Swedish Pulp 27
Pope Alliance Co. Appeals Judgments 28
Tennessee Paper Mill Improvements 29
New Paper Box Plant for Albany 29
Wisconsin Mills Protest Freight Rates 30
Flambeau Paper Mill Improvements 30
Paper Testing Methods Explained 30
Chicago Paper Market Improves 32
Salesmen's Association Activities 32
Cash and Carry Paper House Opens 32
China Clay Corporation Formed 34
International Save the Forests Week 34
Paper Demand Spotty in Boston 36
Pennsylvania Mills Curtail Operations 38
Lindsay Paper Co. Adds New Products 38
Hooper Paper and Twine Co. Expands 38
Scott Co. Operates Largest Tissue Machine 40
Laurentide Power Sale Rumor 40
Power Plant Section 42
Iroquois Asks for Discharge of Mortgage 50
Art and Industry of News Print 50
New York Trade Jottings 54
Editorial 56
To Build Demonstration Mill 57
Union Officials Address Paper Makers 57
Diana Paper Co. Appeal Heard 57
Technical Section
Paper for Blue Prints 59
M. I. T. Leads in TAPPI Membership 60
Chemistry and Technology of Cellulose 61
Three New TAPPI Committees 67
U. S. Patents on Paper Making 68
Cost Section 69
Obituary 74
Imports of Paper and Paper Stock 76
Paper Mill Stocks and Bonds 80
New York Market Review 82
Miscellaneous Markets 84
Market Quotations 84

THE PAPER TRADE JOURNAL is indexed in Industrial Arts Index

Want and For Sale Advertisements 91, 92, 93, 94, 95

PAPER CLAY

A good clay pit is the primary essential of fine paper clay.

Our properties include several thousand acres which large area affords ample opportunity to open wide faces permitting the selection of the finest clay for paper work.

R. T. VANDERBILT CO.

50 E. 42nd Street

New York

ESTABLISHED IN 1872

PAPER TRADE JOURNAL

With Which Is Combined

Vol. LXXXVI, No. 18 — PAPER — Thursday, May 3, 1928

Dominion Cites Advantages of Deal with I. P.

Newfoundland Government Shows Benefits Derived By Colony and International Paper Co. Under Agreement — New York, Toronto, and Montreal Investment Bankers Gain Control of St. Lawrence Paper Mills and Plan Capital Reorganization. —Large Imports of Swedish Pulp for Montreal

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., May 1, 1928.—In order that the public may have full information in regard to the conditions attaching to the sale of the Newfoundland Power and Paper Company to the International Paper Company, the Newfoundland Government has issued a synopsis showing on the one hand the advantages accruing to the Dominion of Newfoundland, and on the other hand the advantages accruing to the International Paper Company. The particulars are as follows:

Under the agreement the Colony gets the following:

(1) The construction of four new paper machines—at least 400 tons a day—before 1933 (subject to extending the Gander project to 1935 by payment to the government $100,000). This means:

(a) Employment for over 2,000 people.

(b) Expenditure in construction of $15,000,000 to $20,000,000.

(c) After completion of construction annual expenditure on operation within the country of over $3,500,000.

(d) The Government will get added revenue from this of at least $1,500,000.

(e) The Government will also get yearly revenue from duties at the present rate (except on some replacements) on everything imported for operation. On replacements the Government will get up to 25 per cent.

(2) From the taking over of the present Corner Brook operation the elimination as a practical matter of:

(a) The menace which the Colony faces to-day of having the Corner Brook operations curtailed with the consequent loss of employment.

(b) The possibility which the Colony faces to-day of having to meet interest and sinking fund on the "E" debentures, nearly $1,000,000 a year.

(3) The Government will get $75,000 a year for the years 1928-29-30-31 and thereafter $150,000 o year until 1973.

(4) Exemption from duties on construction are cut from 30 years to 20 years. The exemption on electro-chemical, metallurgical, etc., business is cut down from 50 to 20 years.

(5) Immediate employment is provided through the 25,000 to 30,000 cords of pulpwood which the Gander Company will cut if requested. This means an expenditure of $300,000 a year in the logging years starting in 1928 and ending with 1933.

(6) Surrender by the company of its right to a grant of a lorge water power on the Hamilton River, Labrador.

This is what the company gets from the Government:

(1) Right to export one half cord per year for each ton of production from the new machines built by the International (not including the present ones at Corner Brook).

These rights are conditional on:

(a) Construction by 1933 of a 200 ton addition to Corner Brook.

(b) Construction of a 200 ton mill on the Gander by 1933(with the right to extend to 1935 by paying the Government $100,000).

(c) Operation of the mills at 80 per cent capacity.

(b) Construction of a 200 ton mill on the Gander by 1933 (with adjustable upwards after twenty years.

(2) The Government is building about thirty miles of railroad. The company is paying half the interest on the cost of the railway during construction of the mill. If the mill is not completed by 1935 the company pays full interest and sinking fund.

(3) In respect of duties other than for construction the agreement provides as follows: On food, clothing, hand tools, stores, lumber, on articles intended for use by individuals and numerous other goods and articles enumerated in the agreement the company is to pay the ordinary duties applying from time to time. On replacements, renewals, spare parts, etc., the duty is not to exceed 25 per cent for forty years. On all other things used in the company's business it is to pay not to exceed the present duties for twenty years and not to exceed the present duties plus ten per cent of the value of the articles imported for another twenty years.

Planning for Large Imports of Swedish Pulp

The Harbor Commissioners of Montreal have leased to Doscher, Bendix & Co. the timber depot and saw mill in the Port of Montreal formerly occupied by the British Empire Lumber Company for the storage of westbound cargoes of Swedish pulp en route to United States paper mills, extending from Buffalo through Pittsburgh to the Mississippi. It has been found that this material can be carried more economically if brought up by the St. Lawrence trans-shipped to lake steamers at Montreal and discharged at points on the Great Lakes, than if it was imported through American Atlantic seaboard ports.

Mr. Bendix in an interview, states that he expects to bring about 68,000 tons of high-class woodpulp into Montreal this season, and that he hopes to increase the importations to between 200,000 and 300,000 tons a year. Swedish mills produce about 650,000 tons of high-class woodpulp a year, 200,000 tons of this being used in Great Britain and 50,000 tons on the Continent. The balance, or 400,000 tons, is shipped to the United States, passing through Baltimore, Philadelphia, New York, Boston and Portland to the Central

(*Continued on page 40*)

Pope Appliance Co. Appeals Adverse Judgments

Following Two Defeats in Canadian Courts Plaintiffs In Patent Infringement Action Against Spanish River and Abitibi Organizations Have Been Granted Leave to Appeal Decisions Before Privy Council in England—Defence Claims Lack of Novelty and Invention

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., April 30, 1928.—A good deal of interest centers around the patent infringement action of the Pope Appliance Company, incorporated at Lewiston, Mass., against the Spanish River Pulp and Paper Mills, Ltd., and the Abitibi Power and Paper Company, Ltd., by reason of the fact that after two defeats in the Canadian courts the plaintiff company has now been granted leave to carry the last adverse decision to the Judicial Committee of the Privy Council in England in an endeavor to prevent Canadian paper companies from what they claim is infringement on their Pope patent for the use of compressed air in automatically threading the paper through the calender.

The case was first tried in the Exchequer Court, when the trial judge, in giving decision, commented as follows: "In view of the knowledge disclosed in the prior art; in view of the similarity of purpose and mode of the application between Pope and others, including Pope himself, it seems to me that the patent at suit is but the adaption to a new purpose of a known method or appliance which is analogous, and that no invention is displayed in the manner in which it is applied. It would seem reasonable to me to exclude the whole world through doing the same thing and that is what it would mean if Pope is a valid patent. Upon this ground I think the plaintiff also fails. Altogether the plaintiff's action for infringement fails. The defendant will have its costs of action."

Judgment of the Supreme Court

Carrying the decision to the Supreme Court the evidence was again submitted by the Pope company and a second adverse decision given. The judgment in the appeal constitutes an interesting document and one which will be read with interest by the pulp and paper industry both in Canada and the United States. It reads as follows:

"The appellant is the assignee of Charles E. Pope, now deceased, and as such is the owner of Canadian patents, Nos. 186,500 and 192,726 for 'improvements in method and machine for making paper', granted to Pope on the 10th of September, 1918, and the 16th of September, 1919, respectively. It brought two actions for infringement, one against the Spanish River Pulp and Paper Mills, Ltd., hereinafter termed the Spanish River Company, and the other against the Abitibi Power and Paper Company, Ltd., which I will call the Abitibi Company. In the action against the Spanish River Company it was alleged that that company had infringed both patents, and at the trial the defendant admitted infringement of patent No. 186,500, so that the action succeeded with respect to that patent but went on to trial as to patent No. 192,726. The action against the Abitibi Company alleged infringement merely of patent No. 192,726, which accordingly is the only patent of which the validity is now in question.

"The action against the Spanish River Company was tried first and, by consent, the evidence adduced was made applicable to the action against the Abitibi Company, the trial of which immediately followed, some additional evidence having been introduced. In both cases the actions were dismissed by the Exchequer Court, on the ground that patent No. 192,726 was invalid. The appellant now appeals in each case.

Description of Patent

"The patent is for an appliance for carrying, in a paper manufacturing machine, the paper from the drying rolls to and through the calendars. The modern paper machine presents this feature that a solution of pulp and water is introduced at one end, some 200 feet away, the fully maufactured paper emerges and winds itself upon rolls. This involves first the gradual removal of the water, the pressing and drying of the residuum of pulp, and finally what is called the calendering of the paper, which is done by passing it through several heavy steel rolls in order to give it a proper gloss or smoothness of surface.

"The patent device deals with the dried paper as it passes from the drying rolls on to and through the calender rolls. These calender rolls, eight or ten in number, are in a vertical stack; the motive power is applied to the lowermost and much the largest roll, and each of the other rolls revolves by friction with the roll below it, each turning in an opposite direction from the one immediately above and below. The paper web, which may be, and frequently is, twenty feet in width, enters the stack of calender rolls at the top, or between the two uppermost rolls, and moves in the same direction as the lower roll, that is to say it winds around each successive lower roll, thus changing its direction from side to side at each roll, and it emerges at the bottom in a fully manufactured state.

"The patent device is intended to facilitate the passage of the paper through the stack of calender rolls. It is stated to consist in a combination between the calenders of a paper machine, an appliance called the 'doctor' arranged to strip the paper from an upper calender roll, and an air pasage designed to direct a current of air against the upper calender roll beneath the point of contact of the 'doctor' therewith, so as to impinge on each roll and be directed against the paper passing between the upper and lower calender roll, and press the paper against the latter roll.

Function of the "Doctor"

"In explanation of this description, we are told that the paper web has a tendency to continue revolving around the same roll after it has passed through the nip or bite between the two rolls. To prevent this, there is first the 'doctor,' which consists in a sharp knife on a rigid frame extending the whole width of the paper web. The shape of the 'doctor' varies, but in the drawings of the patent it is shown as having two arms at right angles, one horizontal containing the scraping knife and the other vertical extending downwards. The 'doctor' can at will be brought into contact with the roll or removed some distance therefrom. When it is in the former position, as far as one can judge from the drawings, the knife scrapes the upper roll at about 10 to 15 degrees beyond the nip or bite, and thus the paper is prevented from revolving around the upper roll. In addition there is in the vertical arm of the 'doctor' a pipe through which a stream of compressed air is directed against the upper roll just below its point of contact with the knife, and this stream of air, after reaching the upper roll, deflects downwards towards the lower roll, thus pressing against the paper and forcing it to revolve around the lower roll. This operation is repeated at each roll until the paper emerges from the nip between the two lower rolls and the calendering process is complete.

"When a web of paper is to be started through the calender rolls, the practice is to cut off a portion of the paper from the web, thus leaving, at the inside edge of the paper machine, a strip of about six inches wide, called the lead strip, and when this strip has successfully passed through the rolls it is gradually widened until the whole width of the paper web goes through the calender rolls. It is stated that in the modern paper machine the paper passes through these rolls at a speed of from 600 to 1,000

feet per minute. What the specifications chiefly emphasize is that, before the alleged invention, the operation whereby the lead strip was made to go through the calender rolls was attended with great danger to the operatives, inasmuch as they had to direct this strip by hand, so as to cause it to engage the nip or bite between the two rolls, with the result that not infrequently their fingers were caught and crushed. With this appliance there is stated to be a saving of manual labor as well as the prevention of injury to the men. I think its utility can be granted, and this apparently was the opinion of the learned President of the Exchequer Court, who, however, did not regard that as conclusive of the validity of the patent. The crucial question is whether this device, however useful, involves invention. This brings me to the appellant's action and to the defenses set up by the respondents.

Case for the Defense

"Both actions were based on infringement by the defendants, with the usual demand for damages, an injunction, on account of profits, etc. The principal defenses of the respondents may be briefly summarized. They were:

"1. That the patent in suit had not been infringed.

"2. That it was void for lack of novelty and invention.

"3. That the patent was void because the alleged invention had been in public use or on sale with the consent or by allowance of the alleged inventor for more than one year previous to the application for a patent in Canada.

"4. That at all events the respondents were protected as to the use of the device.

"The learned trial judge did not give effect to the last two defenses. He dealt at considerable length with the second defense. Generally agreeing with the contention that, in view of the state of the prior art, the patent in suit lacked invention, he rested his judgment dismissing the plaintiff's action on the ground that all that Pope had done was to apply a well known thing to an analogous use, and that there was no invention in the mode of application.

No New Principle Claimed

"It must be remembered that the plaintiff's patent does not claim to have invented a new principle for directing the paper web, or the lead strip to which its width has been reduced, towards the lower roll. The evidence shows, and it is not disputed, that the appliance called the 'doctor', of which there are two standard forms, was well known, and it is employed by Pope for the very purpose for which it was designed. The use of a stream of compressed air for pressing the paper against the lower roll was also familiar in the prior art. It is true that different appliances were devised and patented for directing this stream of air towards the paper, so as to press it against the lower roll, these appliances sometimes taking the shape of a windshield surrounding a part of the lower roll, with perforated holes on the inside surface through which the current of air was forced against the paper, sometimes of cylindrical pipes, also with perforated holes for the same purpose; but although there was a difference in the shape of these appliances, the function they were designed to perform was identically the same as in the patent in suit. Moreover, Pope himself had patented in 1915, a device, not dissimilar to that in question, which dealt in a like manner with the wet web as it passed through the press rolls, by delivering a thin sheet of air substantially tangential to the cylindrical surface of the press roll, so as to take off the web from the press roll in case it should have a tendency to adhere thereto. It does not appear to have required invention to adopt a similar method for directing the dry paper through the calender rolls, which is a use analogous to that mentioned in the Pope patent of 1915.

No Room for Novelty

"Nothing more is claimed here than a combination between a 'doctor,' which was old, the calenders of a paper machine, also old, and an air passage to direct air against the surface of the upper calender, below its point of contact with the 'doctor.' All this was well known in the art, noticeably the use of the stream of compressed air to force the paper downwards along the revolving surface of the lower roll until it reached the nip or bite, when the same process was repeated. There was no room for novelty except perhaps in the shape of the appliance, or possibly in the precise point towards which the stream of air was directed. Such features, however, cannot justify the claim of the patentee, who did not seek a patent for an improvement of an existing device, but rested on a combination, all the elements of which, and the very purpose for which it was designed, were old and well known in the art. I have very carefully read the testimony and considered the patents put in evidence, and I do not think the patent in suit can be supported. The learned trial judge has so fully discussed the issues and the evidence that I feel I cannot usefully add anything further to what he has said. The existence or not of invention involves merely a question of fact, and on this question of fact I think the appeal fails. It is not necessary to express any opinion as to the other defenses of the respondents. I would dismiss both appeals with costs."

It is from this judgment that the Pope Appliance Company are now appealing to the Privy Council, in England, application to do so having been granted by the Canadian courts.

Thaddeus C. Sweet Dead

Thaddeus C. Sweet, president of the Sweet Bros. Paper Manufacturing Company, Inc., of Phoenix, N. Y., and member of Congress from the 32nd New York District, was killed on Monday afternoon when an airplane in which he was riding from Washington to Oswego made a forced landing near the Whitney Point fair grounds.

Thaddeus C. Sweet was born at Phoenix in Oswego County, N. Y., November 16, 1872. He received a common school education and graduated from the Phoenix High School. After working in a clothing store in Phoenix and later as traveling salesman for a Syracuse firm he organized with his brother a paper factory at Phoenix, in which business he was engaged from 1895 on. He made his first canvas for the Legislature in 1909, campaigning mainly on the issue of direct primaries, and was elected.

Mr. Sweet was re-elected to the Assembly for successive terms until 1920, serving as Speaker from 1914 until 1920. In December, 1913, he was chosen as the anti-Barnes candidate for speaker of the Assembly, but later was rejected by some of the independent Republicans as being too closely affiliated with that leader. When the Republican conference was held on the night of January 6-7, Mr. Sweet received fourteen votes on the first ballot, with Clinton T. Horton and Harold J. Hinman as the principal candidates of the opposing factions. Mr. Sweet was chosen on the twentieth ballot.

He entered Congress in 1923 to fill the unexpired term of Luther W. Mott and was elected and re-elected for succeeding terms. He was a member of the Executive Committee of the Republican State Committee, and was one of a group which unsuccessfully endeavored to have the New York delegates pledged to Hoover.

Mr. Sweet was a thirty-second degree Mason. He was married in 1894 to Miss Lena May McCarthy of Phoenix, who with four children survives him.

New Paper Box Plant for Albany

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., April 30, 1928.—The Tri-City Paper Box Company, Inc., of New York City, recently incorporated with Henry and Samuel Friedheim as principal owners, has leased the top floor of one of the major buildings in the Simmons Industrial development in North Albany, comprising the former plant of the Federal Signal Works. The company will open a manufacturing plant employing 50 persons as soon as the machinery can be installed. The work of installation is now under way.

Wisconsin Mills Protest High Freight Rates

File Complaint Against Discriminatory Freight Rates on News Print, Wrapping and Tissue Paper From Fox River Valley to Southwest—Allege Rates Are Unduly Preferential to Pacific Coast Mills—Everest Broadcasts Address on Forestry

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., April 30, 1928.—Wisconsin's fight against discriminatory freight rates on paper to the south and southwest has brought partial success, and an effort is now being made to remedy inconsistent rates on print and tissue papers.

Recently the Interstate Commerce Commission issued its findings in what is known as the Southwest case, and specified therein that napkins could not be mixed in with shipments of toilet paper and towels and be carried at the same rate, but must carry a commodity rate of their own, much higher and of such a discriminatory nature that Wisconsin mills virtually would be shut out of the southwestern market.

It was contended in a protest filed by the mills here that the commission's findings were a violation of the specific order of the I. C. C. in the Minnesota-Ontario paper case, Docket 11,950, in which the maximum reasonable commodity rates were fixed from Green Bay and other points to the Southwest.

This protest brought a supplemental report which, taken with the original findings in the Southwest case, Docket 13,535, so far as it relates to the commodity of paper, in bringing about a readjustment is not considered as making any change in rates where now established in the Minnesota and Ontario case, in so far as they relate to the Northeast Texas cities. As a result Wisconsin mills will continue under the same rates as in the past, with the privilege of mixing paper napkins with carloads of towels and toilet paper.

It now appears also that there will be a substantial reduction in the rates on paper towels, napkins and toilet paper to Dallas, Fort Worth and other cities in Northeast Texas so as to remove the discrimination against these cities and the undue preference of Oklahoma City, Shreveport and other cities as found to exist by the commission.

Another complain has been filed with the I. C. C. by thirty-seven mills in the Wisconsin Paper and Pulp Manufacturers Association, alleging that the rates on news print, wrapping and tissue paper from the Fox River Valley to the Southwest territory are actually and relatively unreasonably high and prejudicial to the northern Wisconsin mills and unduly preferential to the mills in California, Washington and British Columbia.

It is pointed out, for example, that the rate on news print from Oregon and Washington are 79 cents a hundred pounds to Dallas, Texas, and 74 cents from the Fox River Valley group. The short line distance from the Northern Pacific Coast group is 2,200 miles to Dallas, while it is only 1,100 miles from the Fox River Valley group. The rates on the higher grades of paper are on a relative basis, it is said. Northern Pacific mills are paying only a 7 per cent greater rate for a 100 per cent greater distance, resulting in an adjustment unduly prejudicial to Green Bay and other Northern Wisconsin mills.

Flambeau Paper Mill Improvements

Overhauling of the Flambeau Paper Company's mill at Park Falls, Wis., is in progress, with the intention of increasing production. Machine No. 1 is being rebuilt, and will have a capacity of 250 feet a minute when the changes are made. All of the steam engines in the mill also are being overhauled. Machine No. 2 is handling all the production for the time being.

Promotion of Commercial Forestry

Wisconsin's permanent organization for the promotion of commercial forestry will be organized quite soon, according to announcement of D. C. Everest, of Rothschild, manager of the Marathon Paper Mills Company. Mr. Everest is chairman of the general committee appointed at the recent statewide forestry conference to devise means of saving Wisconsin's remaining timber.

Members of the organization committee are: R. B. Goodman, lumberman, of Marinette; H. J. Bell, secretary of the Milwaukee Association of Commerce; George F. Kull, secretary of the Wisconsin Manufacturers Association, Madison; O. T. Swan, secretary of the Northern Hemlock and Hardwood Association, Oshkosh; Fred W. Luening, of the *Milwaukee Journal*, and W. R. Wheaton, manager of the Pulpwood Company, Appleton.

Mr. Everest is devoting a large amount of his time to this work. He made an address over radio station WHA, University of Wisconsin, last week in support of national forest week. He said that the three fundamental things necessary now are the choice of lands suitable for timber growing, the elimination of forest fires, and reduction of taxation on forest lands.

Wisconsin is one of the states which the federal government hopes will be among the strongest in the reforestation movement. It is shown by a Washington survey that there are at least six areas in this state aggregating 850,000 acres which the provisions and purposes of the Clarke-McNary law of 1924 could be applied to and made fully effective.

"These lands," says L. P. Kneipp, assistant forester of the United States Forest Service, "are a great potential source of wealth and social service. Their capacity to produce timber has been demonstrated and is unquestioned. They lie in relatively close proximity to what eventually will be the greatest timber consuming center of the nation."

Under the Clarke-McNary act, the government is authorized to purchase these lands and administer them as national forests.

Paper Testing Methods Explained

Methods of testing papers were explained to the paper and pulp classes of the Vocational School at Wausau, Wis., at last week's session by Allen Abrams, chief chemist and head of the technical department of the Marathon Paper Mills Company. Mr. Abrams compared modern devices and processes with the old, and took up every step of the testing processes and explained the instruments used. A number of business men interested in the purchase of paper were invited to the session.

Safety Slogan Contest

Some valuable safety slogans were the outcome of a contest which ended a week ago among employees of the Marinette and Menominee Paper Company, of Marinette, Wis., and Menominee, Mich. The National Safety Council at Chicago chose the winners, who were paid prize money from $7.50 down to $1.00.

The best slogan was that of Harold Tupper, "Safety costs nothing but is worth a lot." Others that won prizes included: "Those who laugh at safety never laugh last"; "Each time you think safety it makes it easier the next time. Get the habit"; "Care—carelessness—what a whale of a difference a few letters make." Thus far this year the company's Menominee mill has operated without a lost time accident.

Rock River Valley Safety Conference

F. H. Rosebush, of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., has been named a member of the committee in charge of the Rock River Valley Safety Conference. The initial meeting of the conference was held this week with an attendance of 480 persons. They were from 33 centers in the southern Wisconsin industrial section. Considerable discussion took place on the best methods of lessening accidents.

Mirrorlike Rolls
with Vickery Doctors
Rolls that have been accurately—and expensively—machined and ground ought to be kept in condition.
Vickery Doctors will keep them so continuously, completely and with the least amount of looking after.
Put a Vickery Doctor on every roll.
BIRD MACHINE COMPANY
South Walpole : : Massachusetts
1862

Chicago Paper Market Exhibits Improvement

General Situation in Paper Industry Reported More Encouraging Than at This Time Last Year —News Print Production Freely Absorbed by Publishers—Book and Cover Papers Continue Active—Demand for Various Grades of Kraft Better Than of Late

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., April 30, 1928.—Conditions in the Chicago paper market continue to improve and though the improvement is slow it is nevertheless general and likely to continue, according to reports. Spring weather is rather slow in arriving but, despite that fact, merchants report a general increase in demand. The fact remains that all business is hard to get, competition keen and the orders rather small, continue of the hand-to-mouth variety.

The Chicago daily newspapers continue to run a fairly large volume of advertising and are taking up a heavy production of news print. Prices are firm and the market reported steady. Book and cover papers continue to improve with the prices in good shape and firm. Fine papers, in general, are fair and reported better than at this time last year. The kraft market is improving with the general situation slightly more optimistic than a week ago, according to reports.

There is far less speculation relative to business conditions than formerly and merchants are quite content to face a problem as it stands and work it out on that basis rather than sit back and merely hope for a solution of their problem. Perhaps that accounts for the more optimistic viewpoint.

Chicago Forest Week Luncheon

A meeting of interest to the paper industry was held at the Congress Hotel during the past week. Coming during the week designated by President Coolidge as American Forest Week, as a special observance of such, the American Forest Week Committee luncheon at the Congress on April 23 was especially interesting. The luncheon was given and directed by the American Forest Week Committee of Illinois and attended by an unusually large audience of interested men and women.

Two distinguished Canadians, the Right Honorable Arthur Meighen, Former Premier of the Dominion of Canada, and the Honorable E. H. Finlayson, Director of Canadian Forests, were present at the luncheon and gave oddresses. Doctor Henry C. Cowles of the University of Chicago, whose work of forest perpetuation in America is well understood and appreciated, was the other speaker on the program. William S. Bennet, chairman of the American Forest Week Committee of Illinois, presided.

This Annual Forest Week Luncheon was largely given over to the interesting talks mentioned above, all directly in line with the stringent efforts being made to preserve the forests and to give thought to all phases of the nation's forest problems.

Salesmen's Association Activities

Talking with H. R. Knott, representative of the Eastern Manufacturing Company, and vice-president at the head of the Chicago division of the Salesmen's Association of the Paper Industry is like getting a breeze of fresh enthusiasm. Enthusiasm because Mr. Knott is certainly enthusiastic about the future plans of the association. For the Monday luncheons held each week at the Hamilton Club Mr. Knott reports that a committee has been appointed to arrange interesting and educational programs having as speakers men of national importance in the paper industry. Educational meetings featured by an exhaustive study of various phases of the paper industry will also probably be carried out, according to Mr. Knott.

Tom Donahue, of the Warren Manufacturing Company, has been appointed chairman of the golf committee and Mr. Knott reports that the first letter on the all important subject of the golf tournaments has already gone out and many enthusiastic replies received. These golf tournaments are a source of joy and fierce competition among the salesmen in the Chicago district and the coming summer should see many a mashie raised in triumph or disaster over conquest or failure.

To make it brief, the program as discussed by Mr. Knott certainly looks great and full of interesting features!

Philadelphia Quartz Co. Moves Chicago Office

The Philadelphia Quartz Company, manufacturers of silicates of soda, have announced the removal of their Chicago offices to new and larger quarters in the Engineering Building, 205 West Wacker drive on May 1. The new telephone number is State 7734. Carl F. Wolcott, field assistant sales manager, who is in charge of the Chicago branch office, also announces the recent addition of Warde C. Cookman as a representative on the city sales staff.

Miscellaneous Trade Notes

The next of the meetings held every sixty days by the Paperboard Industries Association is to be held at the Palmer House, Chicago, May 16 and 17. As reported last week the program will be confined to the regular meetings of the three divisions of the association, container, folding box and board.

The Chicago Paper Company has issued to the trade a group of samples of cover papers designed to give suggestions to printers in the planning of sales literature for customers. The samples are well adapted to needful co-operation between the paper house and the printer and, because of their educational value, are exceptionally valuable as an aid to the printer in discussing printing with his client.

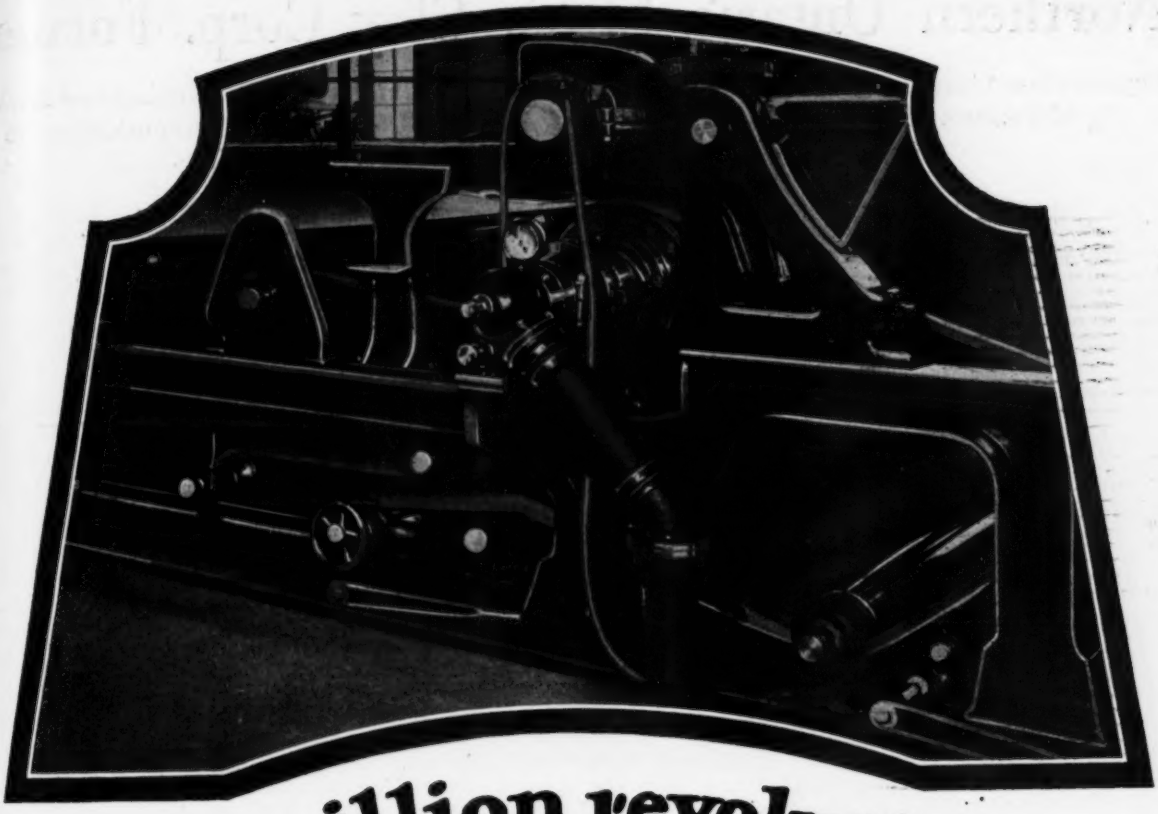
The Warren Manufacturing Company offices, formerly in room 1918 of the Conway Building, 111 W. Washington street, have been moved down stairs to room 1448, where more space will be available. The suite at number 1448 is that formerly occupied by the National Paper Trade Association. Tom Donahue is sales manager in charge of the office.

The first issue of "Rags," a little publication printed in the interests of the Rag Content Paper Manufacturers, has come into Chicago offices. The little four page, 7x10 publication is designed as an occasional reminder to the trade of the importance of good paper from the standpoint of durability, good advertising, impressiveness and good taste. The first issue contains a brief history of paper making; source of rags and their treatment and a number of instances citing the value and economy of using good paper. The bulletin is sponsored by thirty manufacturers of quality papers and is certainly an excellent step in the right way. The newsy pages let the buyer of paper in on a lot of interesting information relative to paper making and, in a striking and forceful way, put over examples here and there of the advantages of using good paper, that hit in the right way.

Colter Rule, of Bradner, Smith & Co., has just returned from a week's vacation down at Hot Springs, Arkansas. It is reported that he played a lot of golf, had a fine time and returned to Chicago in excellent shape and eager to go.

Cash and Carry Paper House Opens

INDIANAPOLIS, Ind., April 30, 1928.—Articles of incorporation have been filed with the secretary of state in Indianapolis by the Cash and Carry Paper House, Inc., of Evansville, Ind. The corporation has a capital stock of $5,000 and is formed to "deal in paper and paper products both wholesale and retail." The incorporators are Isadore L. Silverman, Lorene S. Silverman and Orson A. Tiffany.



36 million revolutions without adjustment

THE strain of one year's continuous service at 1000 feet per minute is certainly a severe test on design and construction. A Kilberry Suction Roll stood this test without loss of vacuum, which proves the correctness of its simple, rugged construction.

It is driven direct from the couch or press drives, no gears used. The suction box is carried in self aligning ball bearings within the steel journals.

Get the facts and compare values.

Our Products Meet Our Promises

KILBERRY Suction Roll

Downingtown Mfg Co. Downingtown Pa.

Northern Ontario China Clay Corp. Formed

Organization Owns Large Deposit on East Bank of Mattagami River—Developing and Marketing of Product Made Possible by Building of Private Railway From Kapuskasing to Smoky Falls—News Print Situation Improves in Canada

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, April 30, 1928.—The Ontario paper industry was deeply interested this week in the announcement that an issue of 100,000 shares of a new company, known as the Northern Ontario China Clay Corporation, Ltd., at $10 per share, would shortly be made. The company is the owner of a large deposit of china clay on the east bank of the Mattagami River, about sixty miles north of the main line of the Canadian National Railways. The developing and the marketing of the product of the deposit have been made possible by the building of a private railway line from Kapuskasing to Smoky Falls, which is only eight miles from the clay properties. The T. & N. O. Railway is now also extended to Coral Rapids.

The most interesting thing about this far north company will be its by-products. Officials of the Northern Ontario China Clay Corporation state that there are three main features of the deposit, china clay, silica sand and a highly refractory fire clay. China clay is used as a coating and filler in the paper, cotton and textile trades and paper manufacturers in Canada are now importing a lot of the clay. The directors of the company claim that their products have been under tests and analysis for the past two years and compare favorably in purity and usefulness with the best imported competition.

International "Save the Forests" Week

During the Canadian Forest Week and United States Forest Week, set apart for the preservation of the wooded wealth of each country, the Hon. Charles Stewart, Minister of the Interior, completed arrangements with the United States authorities for an exchange of speakers. The Canadian Clubs also co-operated in the worth-while movement, the Hon. Theodore Roosevelt, chairman of the American Forestry Committee, addressing the Canadian Club gathering in Ottawa, while Colonel W. H. Greeley, Chief Forester of the United States, spoke before the Canadian Club in Toronto. The Hon. Charles Stewart gave a talk at a joint meeting of the Chamber of Commerce in the United States on the Forestry Association at Washington. A national hook-up of American radio stations was arranged and Mr. Stewart followed President Coolidge of the United States in a broadcast. The Hon. T. A. Burrows, Lieutenant-Governor of Manitoba, spoke before the international gathering of the Hoo Hoo at St. Louis, while the Hon. William Finlayson, Minister of Lands and Forests for Ontario, addressed the Canadian Club in New York City. The Hon. T. D. Pattuloo, Minister of Lands for British Columbia, was one of those who gave an address at Portland, Oregon, before the Chamber of Commerce in that city.

Hinde & Dauch Operations

In connection with the decision of the Hinde & Dauch Paper Company of Canada, who operate a large paper box board factory in Toronto, and who have a straw board mill at Trenton, Ont., to establish a branch factory in Winnipeg at an estimated cost of $1,000,000, it is pointed out that the present Western Canadian paper box market is normally estimated at $2,000,000. It is not known as yet what the output of the Hinde & Dauch plant will be, but its establishment in Winnipeg indicates that the management has every confidence in the growing importance of the western market. Added to this is the development in Winnipeg of the Great West Paper Mills, Ltd., a firm which will manufacture paper products from waste materials—old papers, etc., collected in the city, with which pulp will be mixed. Further, there is the huge plant of the Manitoba Paper Company at Fort Alexander, ninety miles from the city. The Fort Alexander mill was established in 1926 with a capacity of 150 tons of paper a day, drawing its pulp wood from selected areas in the surrounding territory. In 1927, with increasing business and increasing demand for paper products, the mill's capacity was doubled. Although it is less than a year since the first car of Manitoba-made paper in history reached Winnipeg, literally dozens of cars are shipped from the mill daily, and a town of 1,600 population with churches, schools and residences has sprung up at the mill site.

Colonel Greeley on Forest Problems

Canada can profit immensely by the lack of foresight shown in the United States in dealing with forest preservation, Colonel W. B. Greeley, Chief Forester for the United States, told the Canadian Club in Toronto last week. Years ago the best and most of the tree-bearing areas of the United States had been disposed of to private interests. To-day, with these lands depleted, the owners displayed incapacity or unwillingness to undertake reforestation measures. Therefore the government was forced to buy back the land at great expense for the privilege of restoring what had profited private corporations. Ninety per cent of the forest areas of Canada were still publicly owned, Colonel Greeley pointed out. He advised against any part of these falling into the hands of private operators. "Make sure of the future of your forests by extending the principle of public ownership and jurisdiction to the utmost," he said. "Only in this way can you hope to maintain your enviable position as a lumber and pulp wood producing country of first magnitude. We in the United States envy you to-day because we were short-sighted enough to allow our forest lands to slip through our fingers." Colonel Greeley's address was given in connection with Canadian Forestry Week activities.

Notes and Jottings of the Trade

A. B. Gordon, of A. B. Gordon & Co., Toronto, and George R. Gray, manager of the woods department of the Spanish River Pulp and Paper Mills, Ltd., accompanied by their wives, returned a few days ago from spending a few weeks in Georgia and Florida.

Payments of interest on the 8 per cent general mortgage bonds, series A, of the Spanish River Pulp and Paper Mills, will cease on May 1. The bonds will also cease to be part of the financial structure of the new Abitibi organization with which the Spanish River company have merged. The calling of these bonds for that date marks the closing of one more chapter of high-cost financing that was forced upon a number of Canadian industrial organizations in 1920 and 1921, when interest rates reached a high peak and the yield on high-grade government and municipal bonds exceeded 6½ per cent.

Interim reports of the news print situation in Canada indicate a considerable improvement in demand for the month of April just closed as compared with the results for March, and the ratio of production to capacity seems likely to run ahead of the 80.3 per cent indicated last month. So far, shipments have exceeded output, where in March they fell behind by over 600 tons in Canada —amounting to 190,305 as compared with production of 197,976 tons. For April a new machine of Anglo-Canadian Paper Mills may be added to the "installed capacity," but after that few new machines are looked for until Spruce Falls starts coming in. Hence, any increase in consumption in the United States in April, May and June, will serve to correct the situation of "surplus capacity" due to the new machines of Lake St. John, Thunder Bay and others starting up in the early months of 1928.

The death took place in Toronto a few days ago of a well known

(*Continued on page 36*)

WALDRON Paper Rolls

Cost Less to Use Because They Stand Up Longer In Service

Made of Only The Best Paper To Insure Long Life and Lasting Quality.
Paper Carefully Conditioned To Insure Proper Moisture Content.
Shafts and Heads Exactly Proportioned To Withstand The Tremendous Pressure Used In Compressing Waldron Rolls.
Held Under Pressure Proper Length Of Time To Thoroughly Meet Our Exacting Tests for Hardness and Head Balances.

Write for your copy of this instruction sheet

A Copy Will Be Gladly Sent To You On Request!

How a Paper Roll Should be Run In!

JOHN WALDRON CORPORATION
MAIN OFFICE AND WORKS, NEW BRUNSWICK, N. J

208 W. Washington St.
CHICAGO

30 East 42nd Street
NEW YORK

Paper Demand Continues "Spotty" in Boston

While Consumers are Following Hand-to-Mouth Policy, Dealers Anticipate Larger Orders as Season Advances—Box Board Market Rules Steady With Quotations Unchanged—Solid Ledger Paper Stock Advances—Flat Folded News Somewhat Weaker

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., April 30, 1928.—The amount of business transacted in the wholesale paper market here is estimated as approximately the same as for the last several weeks. Consumers are following a hand-to-mouth policy, but dealers are generally cheerful, feeling that their customers will place orders for larger quantities as the season advances. The market is spotty, some houses receiving fair amounts of orders and others few one week, and the next week vice versa. Values show little, if any, fluctuation.

The box board market is steady, but the prospect is favorable for substantial orders in the not far distant future. Quotations are unchanged.

Old papers are in practically the same position, with dealers optimistic as a whole. Solid ledger is difficult to obtain, so that the price has advanced to 2.50 f.o.b. Boston, compared with a previous quotation of 2.10 to 2.25. Flat folded news shows a somewhat weaker tendency, due to less demand and a plentiful supply.

Foreign gunny bagging is dropping, and quotable at 1.75, compared with 1.80 a week ago. Foreign manila rope, however, has advanced to 2.80 to 3.00, compared with a previous range of 2.65 to 2.80. Heavy wool tares are scarce. An order was placed for six car-loads of this commodity, but a dealer says that he has been unable to obtain more than 26 bales since January 1. Heavy wool tares run 35 bales to the car. They are quotable at 1.35 to 1.50.

New and old domestic rags remain unchanged in price, and the market for these materials is featureless, although firmness is anticipated in roofing rags during the next month or two. A dealer says that the wise mill man will cover in this stock now.

In foreign rags, dark cottons are looking up. Current prices have ranged from 1.55 to 1.60, and several hundred tons have sold at the higher price. One mill advanced its price from 1.50 to 1.55, and it is probable that this stock will sell at 1.65. In fact this figure is being quoted now as a maximum price.

All New England Program

The names of the speakers at the "Annual All New England Meeting" of the New England Paper Merchants Association at Providence, R. I., May 8 and 9, are definitely announced. They are: George W. Olmstead, of the S. D. Warren Company, who was president of the association for 1918-19; Frank Floyd, executive secretary of the association; A. H. Chamberlain, assistant secretary of the Fine Paper Division of the association. The final notices of the meeting are being sent out today.

A meeting of the Fine Paper Division of the New England Paper Merchants Association is to be held at the Boston Chamber of Commerce, Tuesday, May 1. President M. O. Byrne will address the meeting and tell what the Springfield and Connecticut sections of the association are doing on membership work. The membership committee of the Boston district will make a report on what they have been able to accomplish.

News of the Trade

Carter Rice & Co. Corp. is sending out samples of Phantom coated paper, a novelty line, with a unique design running through it. This paper, for printing half-tones or process color work, gives advertisers an opportunity to work up for their mailing pieces something entirely different from the regular lines of coated papers. The paper is made in white and India and sold at a reasonable price. The Hazen Paper Company, Holyoke, Mass., is the manufacturer.

Rutter & McNaught, Inc., announce that they have taken over Laidline Cover, a new, attractive line, made in seven colors. Striking effects can be produced with this line for catalogue covers and greeting cards. It is moderately priced.

The April number of "How," edited by A. V. Howland, of Tileston & Hollingsworth Company, mentions the exhibit of that concern in the permanent display of New England's products on the 14th floor of the Boston Chamber of Commerce. The exhibition includes examples of effects obtained by printers and publishers in the use of "Papers of Old-Fashioned Quality" by both the printed word and illustrations in black and white and colors. The central display piece is a large volume produced by D. B. Updike at the Merrymount Press in Boston, for the Society of the Colonial Dames in America. It is printed on Certified Library Record, a permanent paper of 100 per cent new rags. Companion volumes are in Sulgrave Manor, in the British Museum, and the collection of J. P. Morgan. Examples of book work on Flemish Book are shown. The issue also contains stories in regard to Athena Plate and Milton Direct-Mail Pieces and analyses of the April Sheet of the Tileston & Hollingsworth 1928 Calendar.

N. F. Davis, manager of the Davis Paper Company, West Hopkinton, N. H., manufacturer of leather board and box board, is in Florida for two weeks.

K. B. Korbel, of the P. P. Kellogg & Co. Division of the United States Envelope Company at Springfield, Mass., called on the trade last week.

CHINA CLAY CORP. FORMED

(*Continued from page 34*)

figure in the paper industry in the person of George Charles Flint, superintendent of the manufacturing plant of Brown Brothers, manufacturing stationers, who passed away suddenly from a heart seizure while standing in front of his residence. The late Mr. Flint was a life-long resident of Toronto and had been with Brown Brothers for nearly half a century. He was prominent in church and fraternal circles in the city.

The Toronto Typothetae Sales Club, of which a number of wholesale paper salesmen are members, held its annual meeting a few days ago and elected the following officers: Honorary President, A. L. Lewis, Southam Press; President, K. G. Anderson, Southam Press; Vice-Presidents, William Miller and Fred Shaw; Secretary-Treasurer, Louis J. Ball, manager of the Toronto Typothetae. A membership competition between two teams was inaugurated by the fifty printing and paper salesmen present.

A number of the wholesale paper dealers in Toronto were guests of the Ault & Wiborg Company, Ltd., ink manufacturers, when the company entertained the Toronto Club of Printing House Craftsmen at dinner this week. The company's plant was inspected and an excellent entertainment furnished the guests which included an address by Alfred Howell, art director of the Central Technical School, Toronto, on "Art in Relation to Printing." There was also a distribution of prizes won in the Craftsmen's bowling tournament.

I. H. Weldon, president of Provincial Paper, Ltd., and S. F. Duncan, secretary-treasurer of the company, left a few days ago to inspect the Port Arthur plant of the organization. Mr. Weldon will continue his journey to the Pacific Coast where he will spend some weeks on business.

Paper Sales, Ltd., King street, Toronto, have received new sample lines of Canterbury Coverings from John Dickenson & Co., Ltd., London, England, the Toronto firm being sole Canadian representatives for these English cover papers.

DU PONT *Dyestuffs*

DU PONT CROCEIN SCARLET CONC.
PONTACYL CARMINE 2G AND 2B
PONTACYL FAST VIOLET 10B
PONTACYL VIOLET 4BL
PONTACYL BLUE BLACK SX
PONTACYL GREEN NV CONC.
DU PONT TARTRAZINE O

These dyestuffs are particularly suitable for dipping plain and crepe tissues and for calendar coloring. They possess excellent solubility, are extremely fast to light and when used alone or in combination will produce any of the seasonal shades.

E. I. DU PONT DE NEMOURS & CO., INC.
Dyestuffs Department
Wilmington, Delaware

DU PONT DYESTUFFS
REG. U. S. PAT. OFF.

Branch Offices:

274 Franklin Street
Boston, Mass.

8 Thomas Street
New York, N. Y.

232 West First Street
Charlotte, N. C.

126-128 South Front Street
Philadelphia, Pa.

1114 Union Trust Building
Chicago, Ill.

709 Hospital Trust Building
Providence, R. I.

569 Mission Street
San Francisco, Calif.

Pennsylvania Paper Mills Restrict Operations

While Several Plants Are on Full Schedule, Majority Are Working at From 70 to 90 Per Cent Capacity—Book Paper and Cover Paper Manufacturers Continue Fairly Active—High Grade Kraft Paper in Steady Request—Tissues Show Firmer Tendency

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., April 30, 1928.—Backward weather conditions and the attitude of caution which has been governing the industrial and mercantile trades within recent weeks have been reflected in the paper industry with retarding influences. Despite the efforts of dealers to stimulate business with offers of goods that are attractive in prices the trade is suffering from lack of interest on the part of consumers who in normal times are seasonally active. Textile consumers are drifting along in a listless business period and the needs of this particularly prominent Philadelphia industry are accordingly curtailed. Hardware manufacturers and dealers just now are more active purchasers of paper supplies and some of the department stores and mercantile houses are buyers of those grades that are adapted for announcements of spring offerings.

As the dealers drift along the mills are restricting operations to meet the narrower trading requirements. A few are on full schedule but the majority are working from 70 to 90 per cent of capacity. Paper board mills have a fair amount of orders but business is not up to the standard of seasonal activity. Book paper and cover manufacturers are reported fairly busy but demands are not of normal volume. Manufacturers of high grade krafts are enjoying a steady market with prices firm. No. 2 krafts are being freely offered by the mills and manufacturers of specialties. Tissues show a firmer tendency with prospects of advancing prices as a result of the closing of a couple of local manufacturing plants within recent months. Those mills producing building papers are keeping pace with the improved situation that has been noted since the open outdoors permitted of the usual spring building program. Prices of builders papers while steady are still at the low prices to which they were reduced in late December when several mills sent out notices of revisions downward. Glassines are moving fairly lively while paper parchment for wrapping purposes is enjoying a seasonal spurt on account of the anticipated needs of the hot weather.

Though the fine paper market has been a prolonged hand to mouth type for many weeks, recent sales have bulked fairly well. Dry goods stores, department stores, and other larger retail establishments have been buying printing and writing papers more freely during the past week so that total sales bulk fairly well. The elections demand for the spring primaries created a broader market for ballot papers. Fine papers and book papers are the grades being sought by the mercantile trades for springtime announcements and catalogues. No. 2 book papers are in demand for advertising purposes.

With the spring building program well under way the local trade is enjoying increased business for all lines of building paper goods. Jobbers of building supplies are cutting into sheathings and despite the demand are making offers under the current market and below the list quotations of January. The cutting into rosin sized sheathing is almost 10 per cent under the low prices of the early year, when demand was at its lowest.

The tissue market is firming with the retirement of local manufacturers who formerly were heavy distributors to the Quaker City dealers. There is a fair volume of sanitary tissues and towels moving. Tissues for wrapping purposes show the most steady price trend and apparently have become more stabilized.

Samuel Ingber Co. Inc. Develops Rag Specialties

Featuring a specialized business in rags, the Samuel Ingber Company, with offices in the Lafayette Building, has developed an extensive patronage among mills for imported and domestic fiber rags used by roofing and other manufacturers. The local brokers have been receiving regular weekly shipments of rags from Germany, Holland, Belgium and France through Boston, New York and Philadelphia consignments being made to mills in vicinity of these ports or where transportation facilities are linked with the cities by direct rail communications. Since the tariff on wiping rags was raised the Ingber company has been enjoying a broader market for wiping rags of domestic make.

Lindsay Paper Co. Adds New Products

The Lindsay Paper Company, 804 Sansom street, has added several new lines to fine paper stock formerly carried. Among them are the Laurention Book papers manufactured by the Reading Paper Mills which is produced in six colors and white. Other recent acquisitions are the Bantam Manifold stock made by the Chemical Paper Manufacturers Company and the Sheer Leaf, and Meriad Onion Skin Papers also made by the Chemical Company. W. Clement Bentley has been added to the staff as special service man to work in the Philadelphia territory.

E. Latimer Makes New Die Wiping Paper

A specially high finished light and strong die wiping paper is now being made under the trade mark of the E. Latimer, Jr., 126 N. 4th street. The new die wiping specialty is marketed under the Hercules Brand and is sheet paper that runs from 20 to 25 per cent more yardage than the ordinary grades. Samples are now being sent to the trade.

New Twine Sales Service for Garrett-Buchanan

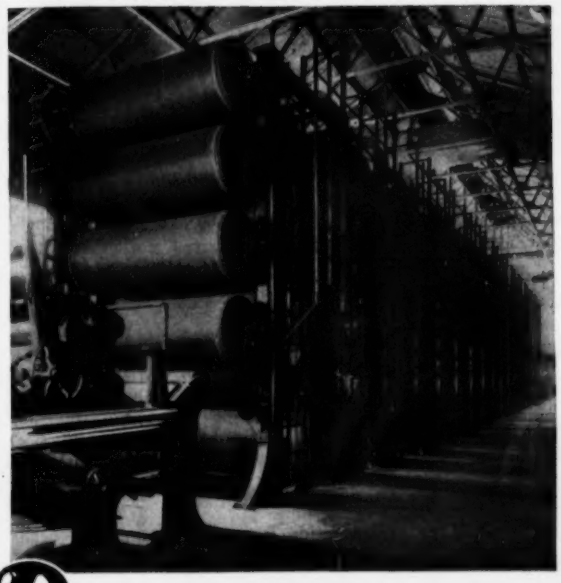
With the addition to the twine department of the former manager of the J. E. Fricke Company, cord and twine distributors, the services of Alfred E. Chase, now will be concentrated on the promotion of the business of the Garrett-Buchanan Company. Mr. Chase will supervise the twine sales of the Garrett-Buchanan Company from the branch house located at 26-28 South Marshall street. The twine department of the company is devoted to the distribution of the cords and other products manufactured by the Columbia Twine Mills, of Auburn, N. Y., for which the firm is exclusive Philadelphia agent, and those of the American Manufacturing Company, of Brooklyn, N. Y. The twine department of the Garrett-Buchanan Company formerly was the business of the late Parke Weikert, and was annexed to the firm shortly after the demise of the founder.

Hooper Paper & Twine Co. Expands

Under the expansion program of the Hooper Paper and Twine Company, recently removed to 270 South American street, the firm is now prepared to enhance its stocks of paper specialties, distributed in wholesale. With the larger warehousing space and adequate shipping facilities provided in two loading platforms and two ton elevator service, the company is now expanding its line wrapping papers, tissues, twines, towels, tissue rolls, sealing tapes and blotting papers sold in wholesale quantities. The business is now located in a modern structure recently built and provided with all modern facilities for handling its enlarged stocks.

Wholesale Merchants Extending Membership

A drive for the extension of its membership has been inaugurated by the Wholesale Paper Merchants Association of Philadelphia and reports on the developments of the organization were given at the meeting held last Friday with HoHward Satterthwaite presiding. The organization will give an outing, the first to be held,



"— this, *Gentlemen*, is something for us to investigate before we build that addition"

Double the Dryer Capacity—*Without* increasing Floor Space

"Too many mills have avoided expensive building programs by installing Vertical Dryers for us to plunge headlong into any building plans without first investigating the Black-Clawson Vertical Dryer proposition. If they will work out for us, we want them."

He's right. If they will work out for you, you want them. So the obvious thing to do first is to find out all about Vertical Dryers—decide on their fitness for your particular dryer conditions before you start to putting up buildings to house that addition to your dryer section.

The Franklin Board and Paper Company added 52 new dryers, built them vertical, and got a 60% increase in drying capacity without adding a foot of floor space.

Vertical Dryers have far more to recommend them than the mere fact that they save floor space. They also eliminate the vapor pockets that inevitably form as the sheet weaves up and down and around the ordinary double, or triple deck, dryer system. With the elimination of vapor pockets a more uniformly dryed sheet is obtained, the steam pressure required to dry the sheet is reduced, and a substantial saving on steam is effected. The Beckett Paper Company, makers of Buckeye Cover saved 3 tons of coal a day and also increased production 6½% by building them up.

We predict that the time is not far off when kraft, bond, book and news machines will be operating with Verticals as a matter of course. So don't put up that addition until you investigate.

The Black-Clawson Company, Hamilton, Ohio

Established 1873

Export Offices: 15 Park Row, New York City

Builders of highest quality paper and pulp mill machinery. Patentees and sole builders of Vertical Dryers and Champion Fourdriniers.

BLACK-CLAWSON

VERTICAL DRYERS

Built with Machine-Tool Accuracy

in the coming month and plans are now under way for the program to include sports and other out door diversions as well as a banquet. Under the membership drive there now is enrolled 95 per cent of the wholesale paper merchants in the Quaker City trade, including mill representatives.

Dual Paper Trade Meeting

Two meetings of the Philadelphia Paper Trade Association were held during the week at the Bourse Restaurant, with President Simon Walter in the chair. The fine paper section and the wrapping paper division met in the dual session, the former on Wednesday and the latter on the following day. It was announced at the meeting that David Keevis had been appointed corresponding secretary of the Association.

N. A. Considine Improves

President Norbert A. Considine, of the Paper House of Pennsylvania, who has been seriously ill with pneumonia for several weeks was able to sit up during the past week and to receive visitors, the first allowed to enter his room since his confinement to the University of Pennsylvania Hospital. Many of his wide circle of trade associates and friends called at the hospital to congratulate him upon his returning health.

Cooperative Ownership of Paper Houses

With the current year two prominent paper houses of long establishment have been placing their business on the co-operative plan of ownership. Among the most recent of the dealers to assume the plan was that of S. Walter, Inc., 144 North 5th street, while the Garrett-Buchanan Company, 16-20 South 6th street, adopted the system at the time of the reorganization of the company shortly after the death of its late head, John L. Sinex. Under the co-operative system employers and employees become sharers in the profits of the concerns. While the system of employee ownership is new in the local trade it has worked out satisfactorily with the Garrett-Buchanan Company since its inception two months ago. The Walter company is just re-organizing along these lines and will shortly put its new business policy into effect with the changes in the capitalization of the firm and the increase to $150,000 from its present capital of $75,000.

Ajax Mills Continue Shut Down

Although it was hoped that the Ajax Mills, manufacturers of tissue papers, would shortly resume operations under the receivership, to date the plant has continued to remain closed to orders. The Ajax Mills were placed under friendly receivership in February and the plant closed pending adjustment of the firm's financial difficulties. It was announced at the time of the appointment of the receivership that the plant would shortly be re-opened. However resumption of operations are now definitely postponed pending further action of the Receivers. It is understood that efforts are being made to adjust the finances of the company, and that an announcement of the future policy of the mills will shortly be made. The paper on hand, it is understood, will be disposed of in the bulk as it is not being offered in smaller lots as anticipated by the local trade.

Scott Paper Co. Operates Largest Tissue Machine

The Chester mill of the Scott Paper Company is engaged in full operation of the largest tissue making machine in the world, which recently was installed. The plant has five standard brands of papers which have been nationally distributed and give the mills a constant outlet of products. Recently additional stock issues to present shareholders of the company provided for extension of capital and for the expansion of business and these steps in the firm's policies will be discussed at the annual gathering.

Decorated Specialty Paper Mfg. Co. Moves

WALLOOMSAC, N. Y., April 30, 1928.—The Decorated Specialty Paper Manufacturing Company, manufacturers of fancy papers, is moving its plant here from Skaneateles Falls, N. Y.

ADVANTAGES OF DEAL WITH I. P. CO.

(Continued from page 27)

Freight Association territory. No extra competition with Canadian firms will be entailed, as just the same amount of wood-pulp will enter the United States. The only difference is that it will pass through Montreal instead of through the American Atlantic ports.

Brown Corporation Calls Preferred Stock

The Brown Corporation, the Canadian subsidiary of the Brown Company, of Portland, Me., has called in its 7 per cent cumulative preferred stock, amounting to $2,000,000. This is being redeemed from the proceeds of a new preferred stock issue of the parent company, part of which is being offered in Canada. The United States company owns all the common stock of its Canadian subsidiary.

St. Lawrence Paper Mills

It is officially announced that the sale of the St. Lawrence Paper Mills has been consummated, and control now rests with a Toronto and Montreal investment banking firm, in conjunction with a leading New York house. The price paid is $125 for the preferred stock and $110 for the common. The purchasing interests announce planning a capital reorganization, which will involve new financing.

Laurentide Power Sale Rumored

Great activity in the shares of Canada Power and Paper Company during the week is associated with the rumor that following the acquisition of the Laurentide Company, that company's subsidiary, Lawrentide Power, is to be sold to the Shawinigan Water and Power Company. It is further said that with the funds obtained from the sale, the company may proceed with the establishment of a new mill in the Gatineau district, which would draw from the extensive limits already owned there. The latter is not considered to be an immediate possibility, however, in view of market conditions in the news print industry.

More New Machines

Charles Walmsley & Co. are constructing two news print machines to be installed and in operation in Price Brothers & Co.'s Riverbend mill by next fall. Each of the machines will have a capacity of between 110 and 125 tons of news print daily, and each will have a width of 234 inches and be equipped with Minton vacuum dryers. They will bring the capacity of the mill up from 200 to 425 tons of news print daily, and the total news print capacity of the company's mills up to 935 tons per day.

Forest Protection Week

There has been a great campaign of education and advertising in Canada during the past week in celebration of Forest Protection Week, now an international event. The campaign has been directed by the Hon. Charles Stewart, Minister of the Interior.

Garden Plots for Strathmore Employes

[FROM OUR REGULAR CORRESPONDENT]

WORONOCO, Mass., May 1, 1928.—The Strathmore Paper Company will place at the disposal of its employees this spring many acres of garden plots, attending to the plowing, harrowing and liming, and a competent man from the Hampden County Improvement League will inspect the gardens at regular intervals. A small deposit to cover the cost of plowing will be made by each garden operator.

John E. Hanny Injured

[FROM OUR REGULAR CORRESPONDENT]

PORTLAND, Ore., April 26, 1928.—John E. Hanny, mill manager of the Crown-Willamette plant near Oregon City, Ore., was injured in an automobile accident April 14, and his father, John R. Hanny, aged 75, a foreman at the plant, died from injuries in the accident. Several other members of the family were in the car which collided with another machine. All were sent to the hospital for treatment, being more or less seriously injured.

WHAT PRICE PER TON?

WHAT DOES IT COST PER TON IN YOUR BEATER ROOM?

Dilts NEW TYPE Beaters on Kraft

A certain mill in the "Middle West" has effected beater power saving of 31.7% per ton of stock after installing Dilts NEW TYPE Beating Engines*

Other mills using Dilts NEW TYPE Beaters show similar good results.

How can YOU meet competition against those mills if you continue to operate with your old beater equipment? Your cost per ton will be too high.

*See page 31, The Paper Trade Journal, issue of January 26.

In the year just ended, the sales of Dilts Beating Engines increased 117% over the previous year.

There is no question about the superiority of the Dilts NEW TYPE Beating Engines, and the progressive mills are rapidly installing them.

Among 1927 sales are NEW TYPE beater equipments to the following mills:

The Southern International Paper Co., Backus-Brooks Company, Lincoln Pulp & Paper, Ltd., Tumwater Paper Mills Company, St. Regis Paper Company, West Jersey Paper Manufacturing Company, Howard Smith Paper Mills, Ltd., Grays Harbor Pulp & Paper Company, U. S. Rubber Company, Southern Advance Rag & Paper Company, E. B. Eddy Company, Ltd., National Paper Products Company, Provincial Paper Mills, Ltd., Consolidated Paper Company, United Paperboard Corporation, International Fibre Board Company, Ltd.

You should fall in line. "Your paper is made in your beaters." You are vitally interested in reducing your cost per ton.

Dilts

MACHINE WORKS, Inc. FULTON, N.Y.

EXPORT OFFICE ~15 PARK ROW~ NEW YORK CITY

Power Plant Section

Reducing Power Costs Through Unit Treatment

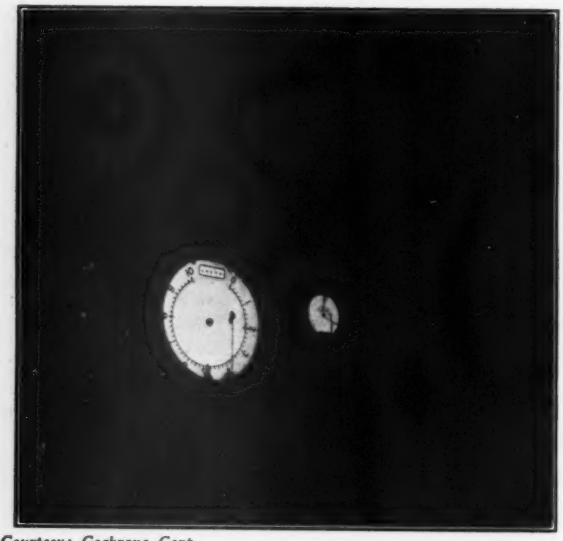
Conducted by REGINALD TRAUTSCHOLD, Consulting Engineer

Modernizing the Mill and Power Plant

Flow Meter Instrument Installations

While it is perfectly true that no investment in connection with a steam plant pays better than the amount entailed to secure good boiler room practice, it is equally true that no investment in connection with the utilization of the output of a steam plant pays better than the amount entailed to measure, record and integrate the consumption of steam. As aptly stated by the eminent 17th century French philosopher and mathematician, Blaise Pascal, "to measure is to economize."

This truism is well exemplified in the experience of a prominent establishment in the middle west that employs much steam,



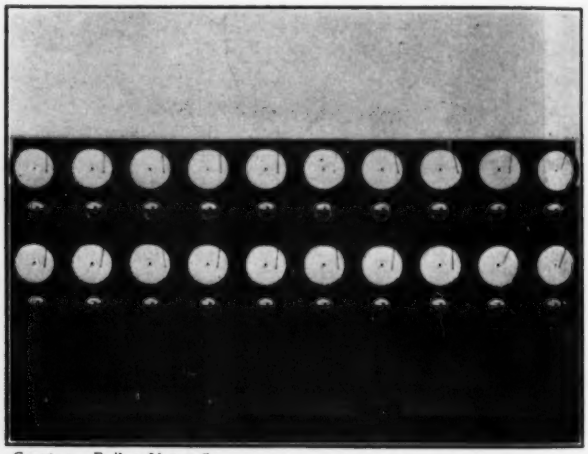
Courtesy: Cochrane Corp.

FIG. 1

Flow Meter recording steam output of boilers.—Terre Haute Paper Co.

as does every paper mill, in the operation of certain process units. The unit cost of the steam production was low, but the utilization steam cost burden appeared high. A modern steam flow meter was installed on a steam line serving certain of the process units and exposed the fact that there was a measurable flow of steam even at times when the units were supposedly shut down. The trouble had been that the operators had habitually been careless in shutting off the valves. Correcting this evil effected a saving of five carloads of coal a week. The flow meter installation, incidentally, cost in round numbers $350.00. At another plant, an installation of four of these flow meter instruments is credited by the Vice President of the operating company with effecting a weekly saving of two carloads of coal, about $250.00, every seven days.

These instances are far from being as unusual as is generally supposed, though a return of 260 carloads of coal a year on an investment of $350,000, or even one of $13,000 on an investment perhaps four times as great, seems almost incredible in these days. Still, there are many paper mills today which are not making full use of instruments for measuring the utilization of steam, including some mills which for one reason or another employ no flow meters and many mills striving to get along as best they can with quite an inadequate number of such instruments.



Courtesy: Bailey Meter Co.

FIG. 2

Twenty Recording and Integrating Flow Meters, electrically operated, in a large paper mill.

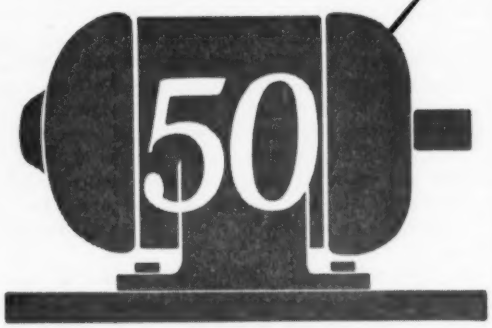
To keep a definite check on not only the amount of steam generated, but also on the amount of steam used at the point of consumption, flow meters should be installed, to measure the boiler output, a meter per boiler is advisable; to account for the steam to the various paper machines; to the bleach plant and to the digesters. It is also very desirable to meter the boiler feed water. By making proper use of the statistical records rendered by the instruments so located, not only is definite information provided as to those cost accounting essentials of steam requirements and steam utilization by each production unit, but very substantial reductions in steam consumption may invariably be effected. In fact, the investment entailed for the flow meters, running usually in the neighborhood of $350.00 to $450.00 per instrument, will frequent be absorbed by the savings which will result from their use within the first year, or in even less time. In addition to savings directly attributable to the measuring of the steam, substantial as these invariably are, the information made available by the instruments almost always makes possible an increase in

ELECTRIC MOTORS

Five years ago

MOTOR MANUFACTURERS USED BALL BEARINGS

Now more than



MOTOR MANUFACTURERS USE BALL BEARINGS

900

FIVE YEARS AGO AND NOW

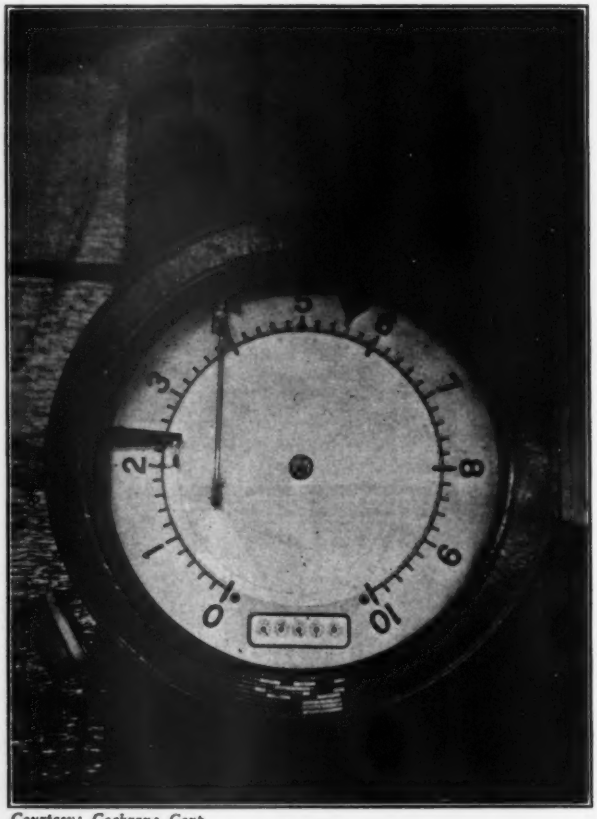
New Departure
Quality
Ball Bearings

the boilers' rating and an improvement in the evaporation per pound of coal.

At the Northern Paper Mills, Green Bay, Wis., where power costs are said to represent 25 per cent of the total conversion cost, an installation of twenty-three steam-flow meters is largely responsible for an improvement in evaporation per pound of coal of about 33 per cent. This is reflected in substantial savings in operating costs and has made possible the caring for a large increase in steam demands without enlarging the plant, as would otherwise have been necessary. As this installation, made about seven years ago, is quite representative of what may be termed modernizing the mill and power plant by suitable flow meter installations, references to the instrument layout of the plant and to its practices can very properly be presented here, although a complete description of the plant by H. W. Gochnauer, plant engineer of the mills, appeared in the periodical *Power* for January 25, 1927.

Meter Installation at the Northern Paper Mills

The seven units of the boiler battery, the feed water supply to which is measured by a venturi meter, are each provided with an



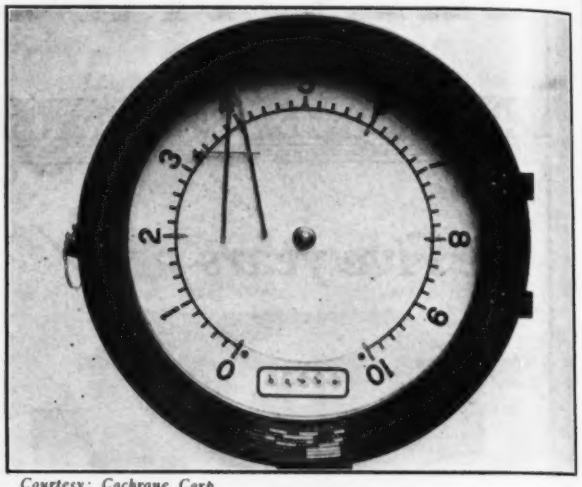
Courtesy: Cochrane Corp.

FIG. 3

Flow Meter measuring steam to a paper machine.—Powell River Co.

indicating, recording and integrating flow meter, the indicator dial mounted on the boiler front and calibrated in boiler horsepower. These instruments serve to measure the steam flow from each boiler passing to the main steam header. Three other flow meters measure the steam passing out to the main power unit of the mill, a steam turbine-generator unit of the extraction type; to the sulphite mill; and to the paper mill, respectively. The steam supplied the sulphite mill is again metered as it is utilized, an individual meter being provided for each of the three digesters and a fourth meter for measuring the steam to the bleach plant. The steam supply to the paper mill is metered at each utilization unit, six paper machines and one crepe machine. A steam flow meter is installed on the low pressure extraction line from the turbine unit and another such instrument on the exhaust from the bleach plant, such low pressure steam supplies being utilized for mill heating. The power supply and consumption, electric, to the various power consuming units is also measured.

This comprehensive and efficient meter installation also provides means of checking the supply and consumption of steam through-



Courtesy: Cochrane Corp.

FIG. 4

Flow Meter Recorder designed to indicate, record and integrate flow of steam, water or other liquid, and equipped with an additional pen arm to measure either pressure or temperature.

out the plant, insuring extreme accuracy of records and greatly simplifying the allocation of expenses in cost accounting. The steam produced by the boiler plant is double checked. First, by comparing the total steam production, obtained from the individual boiler meters, with the feed water consumption recorded by the venturi water meter; and, second, by comparing the total steam production with the total flow through the three outgoing mains to the power unit, sulphite mill and paper mill. The steam to the turbine is checked by measuring the condensate over a V-notch wier, when the turbine is operated condensingly, a check which provides the information for accurate calibration of the turbine meter. The meter in the extraction line from the turbine is checked by measuring the condensate in conjunction with the turbine meter after the latter has been calibrated. Finally, the paper machine steam-flow meters are tested by collecting and weighing the condensate from the driers.

The pounds of steam per pound of coal fired are computed for each shift, by weighing the coal fed each boiler during the shift and apportioning it to the respective boiler output records per shift supplied by the boiler meters. This furnishes full information as to how the various boilers have been behaving during the shift. Also, this practice brought out the fact that the pounds of steam per pound of coal varied quite noticeably with the load on the boilers, the best results being secured when the boilers were driven at an average of about 175 to 200 per cent of their normal rating.

When the meters were first installed, it was the usual practice to operate the boilers at about their normal rating, securing an average evaporation per pound of coal of rather less than 7 pounds. Driving the boilers at around 200 per cent of rating, which has been done without any decrease in the life of the boiler settings or of the furnaces, has brought the rate of evaporation up to 9¼ pounds of steam per pound of coal fired, or better. This is a net gain of about 33 per cent, so increasing the capacity of the plant that no additional boiler capacity has been

SCHOPPER

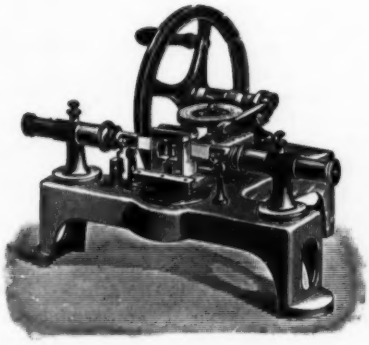
World Standard Paper Testers

All Kinds of Scales

Patented

Schopper-Riegler Beating Tester
Uniformity of beating means better paper.

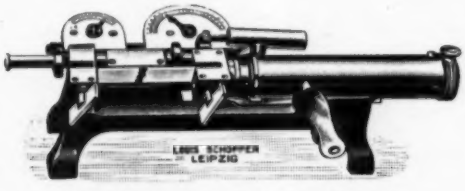
The Schopper Standard Desk Micrometer
Carried in stock—1/1000 of an inch for Boards, 1/2000 of an inch for Paper.



Schopper Folding Tester
The folding test has become standard for bonds, ledgers, and Kraft papers.

Schopper Strength and Stretch Tester

Small Piece Pocket Paper Scale
By weighing a piece 2 in. by 4 in., gives basis weight 25x38, 24x36, 22x34, 500 sheets.



Rapid Strength and Stretch Tester

FOREIGN PAPER MILLS, Inc.

Sole Agents

72 DUANE STREET, NEW YORK

Warehouses: NEW YORK—MONTREAL

Write for Booklet on Paper Testing Instruments P-100

needed to keep pace with the rapid strides made in the production of the mills.

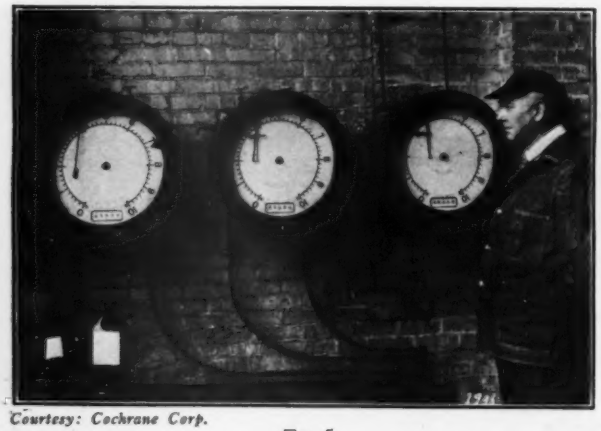
This somewhat detailed exposition of the flow meter applications in this plant has been made for the reason that there have been installations of flow meters in paper mills which have been reported as unsatisfactory, the contention being advanced that the meters were either not accurate or did not supply sufficient information to warrant their installation. In such cases, the fault lies not with the instruments, if they are of modern approved types, but either to the meters not being properly calibrated or to the fact that not enough instruments were provided for a complete installation. Of course, if the instruments are not correctly adjusted and kept accurate by periodical check-ups, such as those which are practiced at the Northern Paper Mills, they cannot prove efficacious in effecting the substantial economies rightfully to be expected. Also, if steam is not metered at all critical points throughout the mill, important records pertaining to the unmetered portion of the supply can only be estimated and such approximations are not very apt to provide balance with the metered records. This is very liable to throw doubt upon all the records, even though the errors are limited usually to the apportionments made of the un-metered steam.

Practical Experience Questioned

The unreliability of dependence upon practical experience for information concerning the generation of steam, at least, was amusingly shown in a plant where four flow-meters were installed to measure the output of two 150-horsepower and two 185-horsepower boilers which for some time had been cared for by an experienced fireman who thought he knew all about the particular boilers.

At the time the flow meters were being installed, the fireman was asked how he thought the various boilers were operating. After a careful inspection of each, he replied that boiler No. 3, rated at 150 horsepower, was carrying the heaviest load and that the other three were steaming at very close to their respective normal ratings. When the flow meter records were read, it was found that boiler No. 3 was carrying less than 90 horsepower and the loads on the other boilers were 140, 100 and 70 horsepower.

The fireman was absolutely convinced that his estimates were correct and ridiculed the values recorded by the meters. However, after working with the fires only a short time, he had three



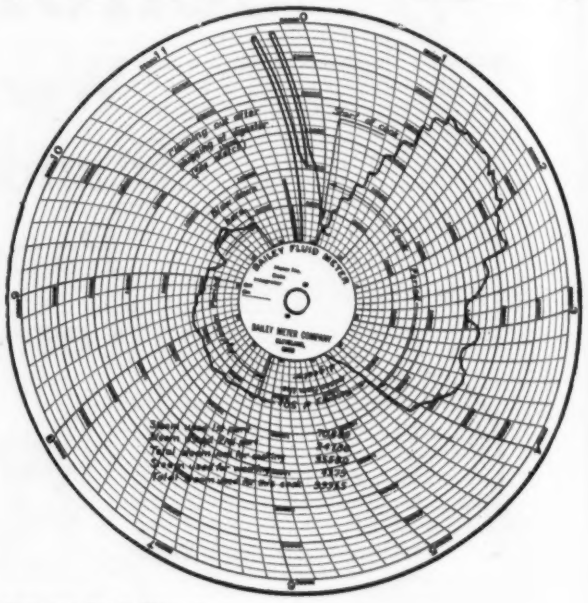
Courtesy: Cochrane Corp.

FIG. 5

Three of the nine meters at the Alton Box Board & Paper Co. (See text.)

of the boilers carrying the entire load of the plant, operating them at about 10 per cent over rating according to the meter indications, something which he had believed unattainable before the installation of the instruments. Since then, the plant has been run regularly, and with decided economy, on three boilers, a very positive indication of the real value of the flow meters.

Another somewhat unusual case, emphasizing the absolute need of meter installations for measuring steam flow if a mill is to be operated efficiently, is the experience of the Malone Paper Company, where flow meters were ordered for measuring the steam output of the boilers. When the instruments arrived, it was found that the mill's calculations of the amount of steam generated was



Courtesy: Bailey Meter Co.

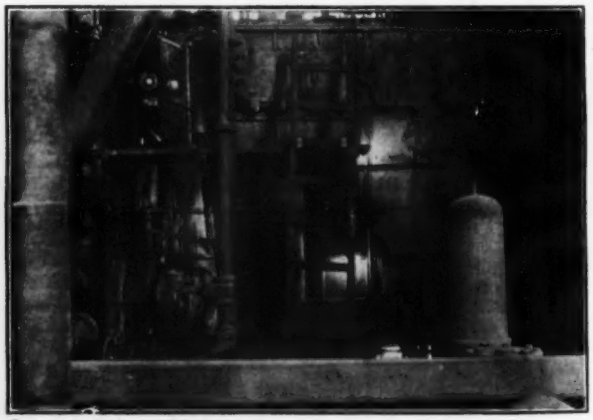
FIG. 6

Chart of steam flow to a 20-ton paper mill digester.

so far out of the way that metering elements with considerably larger capacities than standard for the meter sizes ordered had to be provided before the heavy steam flow which actually existed could be successfully measured.

Compounding the Flow Meter

The meters so far discussed are designed chiefly for the measurement of steam flow, as were the instruments at the Marathon



Courtesy: Cochrane Corp.

FIG. 7

Metering Heater (combined open feed water heater and V-notch meter).—Haverhill Box Board Co.

and Flambeau Paper Companies, discussed in these columns in the issue for August 18, 1927, but there are a number of other types of meters which may be classed as flow meters; gas-flow meters, instruments for measuring the flow of air, etc., water meters and numbers of more complicated devices in that they measure not only velocities, but temperatures and pressures. As, for example, the instruments which not only indicate, record and integrate the flow of steam, water or other liquid, but with an

Our Business Is Founded On Conservation

NEWPORT and ACME WOOD ROSIN are valuable commodities conserved from waste.

CONSERVATION is one thing we sell when marketing NEWPORT or ACME WOOD ROSIN, and conservation is a feature that many of our trade seem pleased to consider when granting us the favor of their patronage.

Without quality the lowly source of NEWPORT or ACME WOOD ROSIN would be of no consequence.

QUALITY OF PRODUCT however is paramount to conservation. Therefore quality becomes an interesting part of our discussion, for on the subject of quality of NEWPORT or ACME WOOD ROSIN, we have much to say that is convincingly correct.

Quality means dependable purity, cleanliness and chemical uniformity.

Visualize the thousands of carloads of NEWPORT and ACME WOOD ROSIN sold by us all over the world as further evidence of economy in price.

Then next to conservation and quality of product comes another absorbing topic, PRICE. Here again we hold interest, since with guaranteed quality we are in a position to show ECONOMY IN PRICE of NEWPORT or ACME WOOD ROSIN.

The use of these Uniform Rosins improves the possibility for Uniform Size

GENERAL NAVAL STORES COMPANY

Incorporated

New York, Cincinnati, Chicago, New Orleans, Philadelphia, Minneapolis

The oldest and largest organization in the world exclusively engaged in selling "Steam Distilled Wood Turpentines," Pine Oil and Wood Rosin

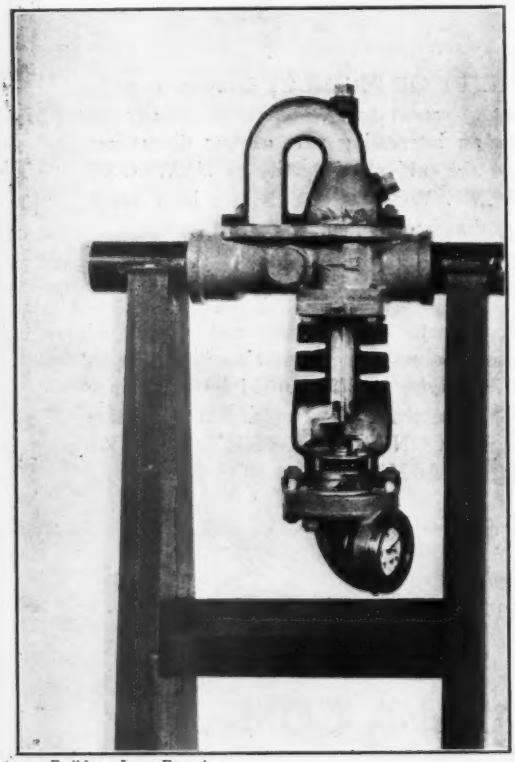
Address any Company Office when needing Rosin Research Aid Laboratories at Cincinnati, O., Pensacola, Fla., De Quincy, La.

additional pen arm measure either pressure or temperature, such as those which are in service at the Alton Box Board and Paper Company, Alton, Ill. Three of the instruments of this type which are in service at this plant are illustrated, one instrument measuring the steam flow and pressure to the turbine of a turbine-generator unit, another the steam and pressure lead from the turbine for paper mill use and the third measuring the circulating water to the condenser.

Then there are the boiler meters which indicate, record and integrate the steam flow, record air flow and flue-gas temperatures, and indicate furnace draft, which have found much favor in paper mill service, as all this essential information for the efficient operation of the boiler plant is plotted on a single chart, with or without a multi-pointer gage for furnishing instantaneous readings of all the secondary operating conditions of draft, temperature, rate of flow, stoker or feeder speed, r.p.m., and other factors, as many as twelve in all, on a single instrument. The information of these secondary operating conditions indicated by the multi-pointer gages is easily read at a distance of 20 feet or more.

Saving 4,249 Tons of Coal a Year

An excellent example of the efficacy of these boiler meters in cutting production costs is at the Great Northern Paper Company,



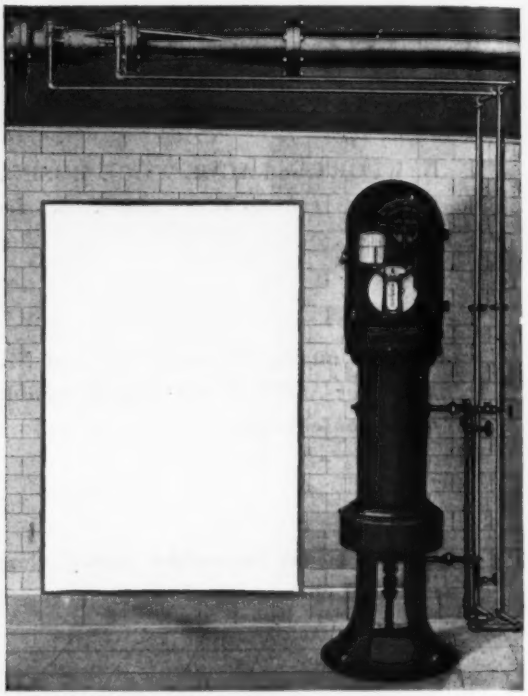
Courtesy: Builders Iron Foundry.

FIG. 8

Shunt Steam Meter.

Millinocket, Me., where such instruments serving a battery of twenty-three boilers are credited with effecting a net saving in coal per year of 4,249 tons. At $3.75 per ton delivered, this means a saving in fuel alone valued at close to $16,000 a year.

At this plant, the meters are calibrated in percentages of boiler rating for both steam and induced-draft flow, i.e., in similar units, so when the air supply to the furnace is correctly proportioned to the economical requirements of the fuel consumed, the two indicating pen pointers move together as the load varies. When such movement does not take place and the pens trace separate paths, it is an indication that a faulty fire-bed condition exists or that the blower speed is not suitably adjusted to the load. As the flue-gas temperature also bears a definite relation to the activity of the fire-bed, or load carried, the path traced by the flue-gas temperature pen follows the graphs traced by the steam and air flow pens concentrically, when all is as it should be. If this temperature graph approaches the common path traced by the other two pens, indicating a high flue-gas temperature, it is a sign that the heat transfer surfaces of the boiler need cleaning.



Courtesy: Simplex Valve & Meter Co.

FIG. 9

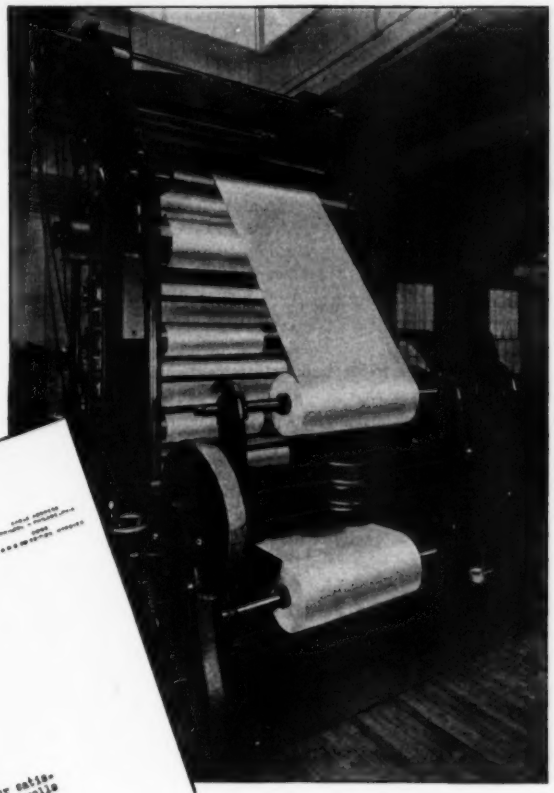
Meter Register connected to a Venturi Tube placed in the boiler feed line.

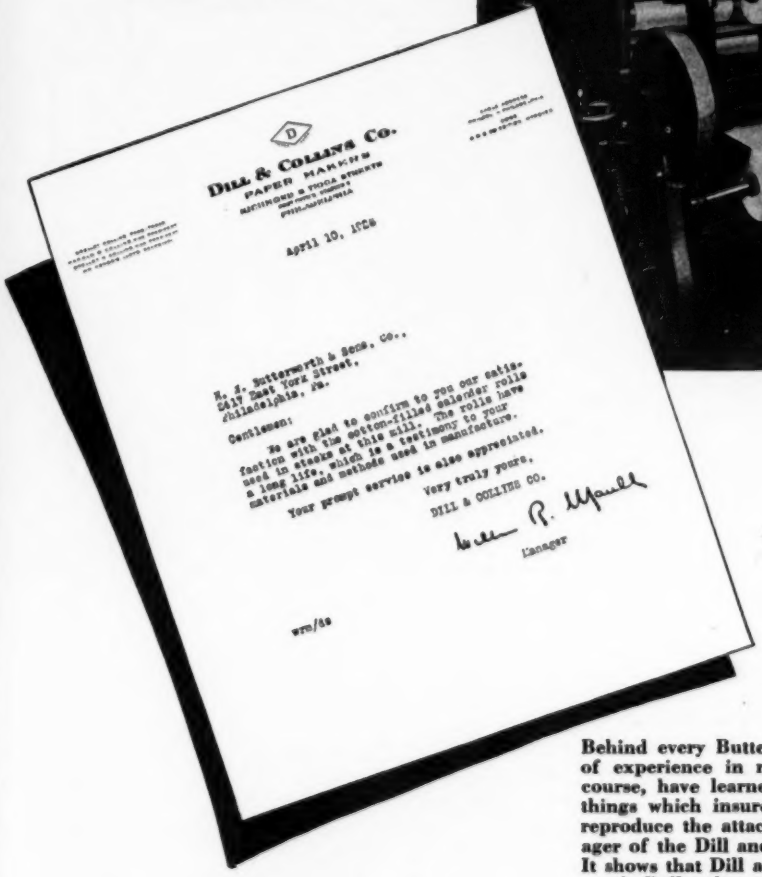
If the paths separate further from one another, on the other hand, indicating a lowering of the flue-gas temperature, it means that there are leaks in the boiler setting and heat is escaping without doing useful work. These indications by the flue-gas temperature graph are dependent, of course, upon maintaining a correct relation between the steam flow, or generation, and the air supply for effective fuel consumption.

The control afforded over furnace conditions in this manner is highly important at the Great Northern Paper Company plant, for load peaks not infrequently call for boiler operation at 250 per cent rating or more and even under ordinary conditions of load the boilers are operated at from 145 to 150 per cent of rated capacity. Occasionally, the load drops off sharply, necessitating the cutting-off of a boiler or two, but this is readily done with the necessary dispatch by the operating crew, the recorded graphs furnishing accurately timed instructions for so doing.

The boiler meters installed, which supply the detailed information that makes such sensitive control of the furnace conditions possible and effect a net yearly saving in fuel alone of 4,249 tons of coal, valued at $15,931.75, entailed an investment of about $18,000, so the yearly yield, or return, on the investment is a matter of 88.5 per cent. This, it will be noted, while somewhat higher than the rates of return on the flow meter installations at the Marathon and Flambeau Paper Companies, discussed last August, 81.6 and 62.7 per cent, respectively, is of very much the same order in weight and likewise effects a reduction of a goodly

Butterworth Rolls in the Dill & Collins Plant Philadelphia





DILL & COLLINS CO.
PAPER MAKERS
MACHINERY & TOOLS STEELS
PHILADELPHIA

April 10, 1928

R. J. Butterworth & Sons, Co.,
Lily East York Street,
Philadelphia, Pa.

Gentlemen:

We are glad to confirm to you our satisfaction with the cotton-filled calender rolls used in steam at this mill. The rolls have a long life, which is a testimony to your materials and methods used in manufacture.

Your prompt service is also appreciated.

Very truly yours,
DILL & COLLINS CO.
Wm. R. Maull
Manager

wrm/ls

The entire stock Butterworth Calender Rolls in the Dill & Collins Plant.

"The rolls have long life"

WM. R. MAULL
Manager

Behind every Butterworth Calender Roll are years and years of experience in roll making. During these years we, of course, have learned how to build into calender rolls those things which insure long life to the rolls. We are glad to reproduce the attached letter from Mr. Wm. R. Maull, Manager of the Dill and Collins Plant in Philadelphia.

It shows that Dill and Collins are getting out of these Butterworth Rolls what we built into them—long service. If you would like to know something more about Butterworth Calender Rolls we have a folder which will be sent promptly upon request.

H. W. BUTTERWORTH & SONS CO.
Established 1820
PHILADELPHIA, PA.
Plants at Phila. & Bethayres

Canadian Representative: W. J. Westaway Company, Hamilton, Ontario, Canada

Providence Office Turks Head Building

Southern Office 1211 Johnston Building Charlotte, N. C.

BUTTERWORTH CALENDAR ROLLS

number of cents a ton on the production cost of the plant's output. So valuable is the information furnished by instruments of this character, in fact, that H. G. Funsett, secretary and superintendent of the Hagar Straw Board and Paper Company, Cedarville, Ohio, is on record as stating that the most profitable piece of equipment ever installed in his plant was a boiler meter for indicating, recording and integrating steam flow from the boiler, recording the air supplied to the furnace and flue-gas temperatures, and indicating furnace draft. It is not at all uncommon for meters of this type to return their cost in from three to six months, through improved plant operation reflected, not only in actual reduction in fuel consumption, but also in increased capacity and reduction in labor incident to boiler operation.

Flow Meters in Regulating, Detecting and Accounting Services

In many ways, instruments simply of the steam-flow type are instrumental in effecting savings of like weight and in supplying information governing efficiency in paper making, at least in part. A number of paper mills, for instance, are measuring the steam supplied for drying in pounds per pound of paper produced with these instruments, the records from which serve to focus attention upon two highly important considerations, when the drying felts should be cleaned or renewed and information concerning the suitability of the pressure on the roll at the wet end of the machine. The first of these is shown by the fact that when the drying felts become dirty or clogged, requiring cleansing or replacement, higher steam consumption results. The second, by the fact that when the pressure is insufficient more water is left in the sheets and has to be removed by steam in the driers. Incidentally, the records also show breaks on the machine.

A case of detecting trouble with the aid of a flow meter is in an instance where a machine was driven by a steam turbine and most of the drying was done by the exhaust steam from the turbine, where considerable trouble was experienced with non-conformity in quality of paper produced. Irregularities in the steam-flow charts of a meter on the steam line to the paper machine auxiliaries was investigated and found to coincide with the dumping of a large steam trap connected into the system. Further investigation revealed the fact that due to incorrect manipulation in the lines to the trap, high-pressure steam from a point ahead of the turbine nozzle was being fed to the steam trap. The effect of this was a variation in turbine speed every time the trap dumped, the cause of the non-uniformity in quality of paper output.

An application of flow meters in what may be termed an accounting service has been developed for recording cooking processes on individual digesters, which has proved virtually indispensable to many of the users who have adopted such means of controlling the cooking process. A characteristic record chart of the steam flow to a 20-ton digester on which the duration of the cook was approximately 11 hours is illustrated, from which it is seen that a very definite system of cooking and cycle of operations are employed. The cycle, as established, embodies the most desirable characteristics of steam flow for minimum steam consumption to obtain the highest quality of the particular grade of pulp on the specific digester.

The cook consists of two principal periods, the cook and the agitation periods, separated by a period of about 2 hours in this particular case, during which the recovery of SO_2 gases from the digester is effected. The cook period, as shown, covered approximately 4 hours, utilizing 70,800 pounds of steam. The agitation period, lasting about 4 hours and 20 minutes, used 24,780 pounds of steam, following which was the blow-down and a cleaning out after plugging the digester. The steam employed for the washing amounted to 4,375 pounds, making a total steam utilization for the complete cook of a few pounds less than 100,000, as recorded on the chart.

There are, of course, many other forms and types of flow meters, large and small, which are profitably used in paper mill service, from the big metering heaters which are really combinations of an open feed water heater and a V-notch meter to the little shunt meter for measuring steam or for use on air lines, most of which are quite familiar in paper mill service and all of which can be profitably employed in modernizing the mill and power plant.

This discussion has aimed simply to present some few of the many opportunities presented today of cutting production costs through instrument control with approved modern standard flow meters, the information provided by which is virtually indispensable to the economical and efficient operation of the modern pulp and paper mill.

Iroquois Asks for Discharge of Mortgage

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., April 30, 1928—At a special term of Supreme Court before Justice O. Byron Brewster in this city arguments were heard on an application by the Iroquois Pulp and Paper Company, of Thomson, for the discharge of an ancient mortgage held by the estate of Gertrude Thomson Dix. The mortgage was for $25,000 and with the accrued interest claimed by the estate now would amount to about $75,000. After hearing arguments in the case Justice Brewster adjourned the matter until Saturday, July 14, at Elizabethtown.

The mortgage which was held by the late Lemon Thomson upon property at Thomson now owned by the Iroquois Pulp and Paper Company was given in 1887 and was to run for ten years. In 1897 Lemon Thomson died and his estate went to two daughters, Mrs. John A. Dix, and Mrs. Thomson Douglas. The mortgage in question was received by Mrs. Dix as part of her share of the estate. The mortgage was given upon an undivided one—half interest in the Thomson property which is located in Washington and Saratoga counties.

In 1902 the property was sold by the late John A. Dix to the Iroquois Pulp and Paper Company. Counsel representing the estate of Mrs. Dix contends that the deed, which was not a warranty, conveyed only real property and the mortgage, being personal property, remained the property of Mrs. Dix.

The Iroquois Pulp and Paper Company contends that nothing has been paid upon the face of the mortgage or for interest and that under the statutes the instrument should be adjudged paid, twenty years or more having elapsed since the mortgage became due.

The attorney for Thomson Douglas, executor of the estate of Mrs. Dix, contends that interest payments were in fact made by the company in 1909, 1910 and 1915 and presented an affidavit made by the late John A. Dix, a few days before his death, in support of this claim. The affidavit states that documentary proof of this will be found among the papers of Former Governor Dix at his Santa Barbara, Cal., estate. Justice Brewster granted the adjournment until July to permit this proof to be obtained.

It is the claim of Thomson Douglas, executor of Mrs. Dix's estate, that if these interest payments were actually made the mortgage is still in full force. It is said that Mr. Douglas is planning to start an action to foreclose on the mortgage.

The Iroquois Pulp and Paper Company is represented in the action by Attorney Sheridan P. Wait, of Saratoga Springs, while Attorneys Feinberg and Jerry, of Plattsburg, appeared for Mr. Douglas.

Art and Industry of News Print

The Powell River Company, Ltd., of Powell River, British Columbia, has just published an interesting and artistic booklet, entitled "The Art and Industry of News Print."

Illustrated profusely, the brochure describes the up-to-date plant at Powell River and the great natural resources of the organization. The unique transportation facilities which the company enjoys are also demonstrated.

Maximum Capacity for Screening with Minimum Floor Space and Power!

The Voith Centrifugal Pulp Screen has five decided advantages that make it practical for the pulp mill—

Screening action which for sulphite pulp means a larger yield, and for ground wood pulp a saving in power.

Inlet will not clog up.

Easy adjustment of the screening action.

The screen can be run either right hand or left hand.

Practically no wear on the screen plates. The centrally located inlet holds back larger size pieces which would cause injury to the screen plates.

This screen will save considerable power. For Sulphite pulp a 30-45 tons capacity requires only 30-40 H.P. For ground wood pulp a 25-40 tons capacity requires 25-38 H.P.

You should investigate the Voith Centrifugal Pulp Screen. Our new pamphlet describes fully all of its advantages and construction features. Write for detailed information today.

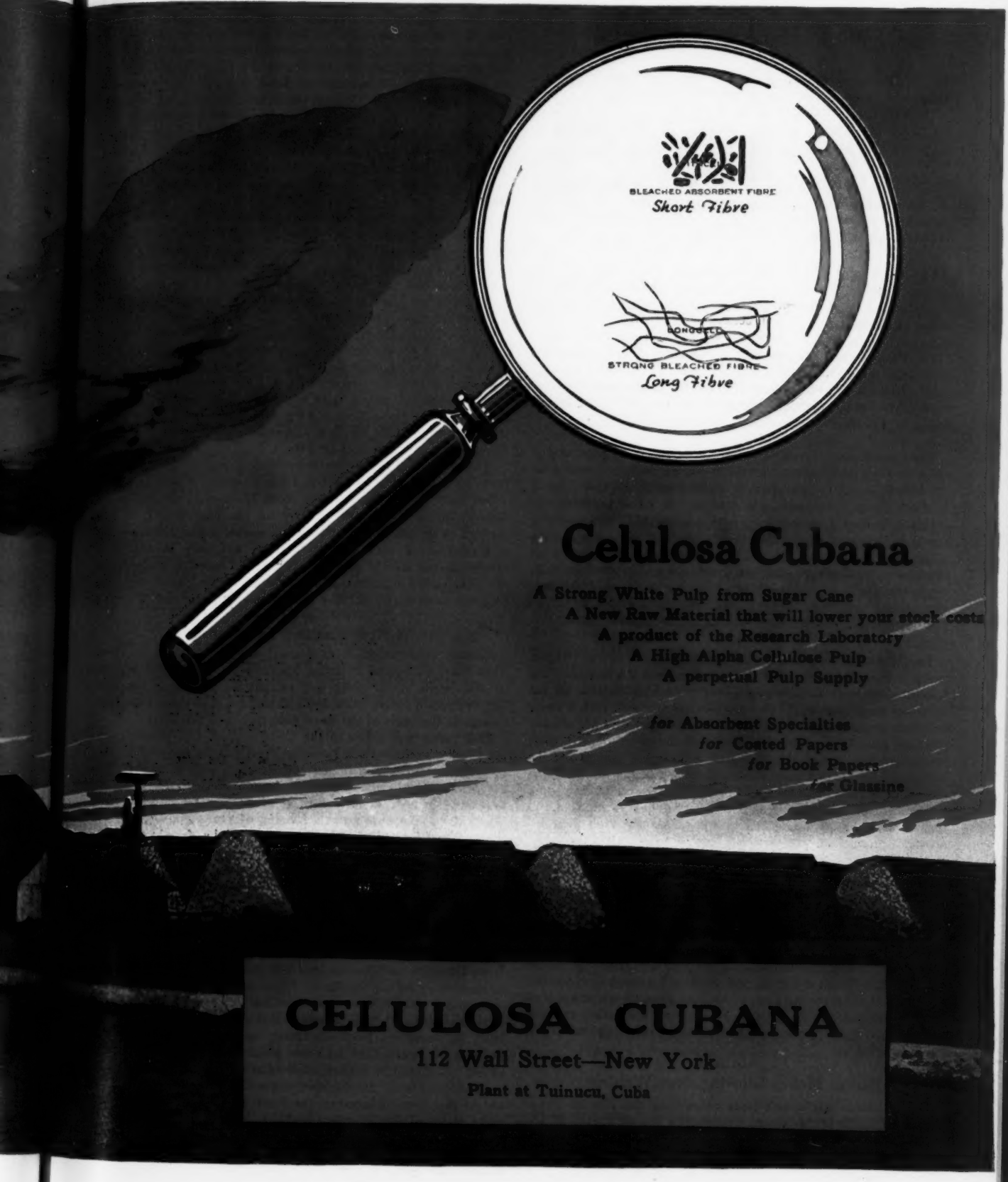
VALLEY IRON WORKS CO.

Machinery for Paper and Pulp Mills

APPLETON WISCONSIN

New York Office: 350 Madison Avenue

Western Manufacturing & Sales Division: Smith & Valley Iron Works Co., Portland, Oregon



Celulosa Cubana

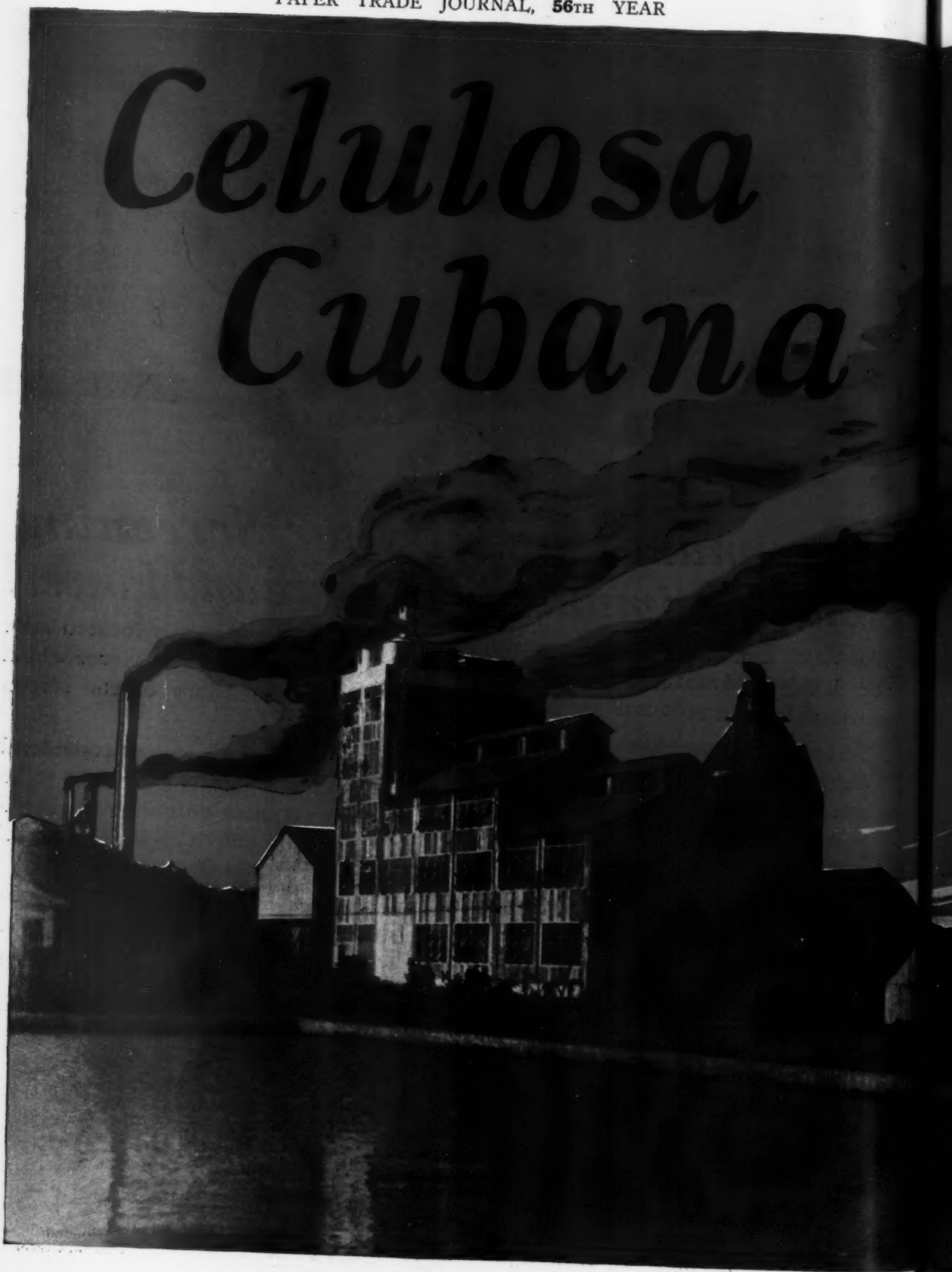
A Strong White Pulp from Sugar Cane
A New Raw Material that will lower your stock costs
A product of the Research Laboratory
A High Alpha Cellulose Pulp
A perpetual Pulp Supply

for Absorbent Specialties
for Coated Papers
for Book Papers
for Glassine

CELULOSA CUBANA

112 Wall Street—New York

Plant at Tuinucu, Cuba


Celulosa
Cubana

Pulp and Paper School at Wausau Closes

[FROM OUR REGULAR CORRESPONDENT]

WAUSAU, Wis., April 30, 1928.—The pulp and paper course at the Central Vocational School wound up Tuesday evening with a dinner, followed by the final lecture of the series. Seventy-five paper men sat down to the following suggestive menu:

Pulped Hog with Ground Wood Laps
Screened Sulphite Jordaned Soda
Semi Bleached Kraft
Head Box Lettuce with Starch Paste Dressing
Beater Rolls with Grease
Lime Sludge with Waste Sulphite Liquor
Black Liquor
with
Sweetened and White Water

The table was completely furnished in paper utensils and it is unnecessary to add that the papermakers made a clean sweep of everything in sight.

This pulp and paper course has probably been one of the most successful given in the country. It was organized through the efforts of H. G. Noyes of the Pulp and Paper Division, Wisconsin Vocational Schools; E. A. Holm, director of the Wausau Vocational School, and Allen Abrams, technical director of the Marathon Paper Mills Company.

Those who participated in the series of lectures came from a radius of fifteen miles and were from the mills of the Marathon Paper Mills Company, the Wausau Paper Mills Company, and the Mosinee Paper Mills Company. These, together with interested persons from Wausau, constituted a total registration of 180. The average attendance was 115, which is unusually good considering the fact that approximately one-third of the men were on shift work and therefore had to miss one evening out of every three.

The purpose of the course was to familiarize the members with the general processes in pulp and paper manufacture; and thereby to stimulate an interest in further detailed study. The lectures were given every Tuesday night, comprising 45 minutes of presentation and from 15 to 30 minutes of questions and discussion.

The subjects and speakers were as follows:

1. Introductory, on January 10th, by D. C. Everest, vice-president and general manager of the Marathon Paper Mills Co.
2. Wood, on January 17th, by P. M. Wilson, secretary of the Marathon Paper Mills Co.
3. Preparation of Wood, on January 24th, by H. G. Noyes, director of the Wisconsin Vocational Schools at Appleton.
4. Sulphite Pulping Operation, on January 31st, by A. Christensen, sulphite superintendent of the Rhinelander Paper Co.
5. Other Pulping Operations, on February 7th, Ground Wood, by Allen Abrams, technical director of the Marathon Paper Mills Co.; Soda and Rag, by H. G. Noyes, director of the Wisconsin Vocational Schools at Appleton; and Sulphate, by N. S. Stone, manager of the Mosinee Paper Mills.
6. Treatment of Pulp after Cooking, on February 14th, by H. A. Skinner, assistant sulphite superintendent, Marathon Paper Mills Co.
7. Bleach Manufacture and the Bleaching Operation, on February 21st, by George Maye, technical engineer of the Hooker Electro-Chemical Company.
8. Beating and Jordaning, on February 28th, by Cary Nystrom, chemist of the Rhinelander Paper Co.
9. Sizing and Loading, on March 6th, by C. H. Champion, sales engineer of the Kalbfleisch Corporation.
10. Coloring, on March 13th, by K. T. King, sales engineer of the E. I. Du Pont de Nemours & Co., Inc.
11. The Fourdrinier Paper Machine, on March 20th, by F. C. Boyce, superintendent of the Wausau Paper Mills Co.
12. Yankee Paper Machine, on March 27th, by R. H. Kelly, paper mill superintendent of the Marathon Paper Mills Co.
13. Cylinder Paper Machine, on April 3rd, by Lymon Beeman, superintendent of the Consolidated Water Power & Paper Co. at Wisconsin Rapids.
14. Paper Finishing, on April 10th, by Wallace Shymanski, of the Marathon Paper Mills Co.
15. Paper Testing, on April 17th, by Allen Abrams, technical director of the Marathon Paper Mills Co.
16. Grades of Paper, on April 24th, by R. M. Altman, of the Marathon Paper Mills Co.

Because of the genuine interest stimulated by this series of talks, four specialized courses of instruction will probably be given next fall in the Vocational School: Sulphite Pulp Manufacture; Sulphate Pulp Manufacture; Paper Machine Construction and Operation; Grades of Paper and Paper Testing.

Begins Construction on Astoria Plant

[FROM OUR REGULAR CORRESPONDENT]

PORTLAND, Ore., April 26, 1928.—The Austin Company has signed a contract with officials of the Northwestern Pulp and Paper Company to start construction May 2 on the proposed plant at Astoria, Oregon. This will be a sulphite mill of 130-ton capacity, and as previously reported the work is scheduled for completion fourteen months after construction starts.

B. T. McBain, pulp and paper specialist of Portland, and Henry Ford, Eastern pulp and paper mill engineer, will have supervision of the work.

Mr. McBain has recently returned from New York bringing contracts for the purchase of the major portion of the company's securities. The company has an authorized capital consisting of $1,000,000 of bonds, $2,000,000 of 7 per cent preferred stock and one share of no-par common for each share of preferred.

The financing of the company began about a year ago, but interruptions have occurred to postpone the starting, and for this reason the officials are eager to get the mill under way now that all plans are complete. The company is offering no stock direct, but bond companies are featuring it in their market.

The mill will be located on Young's Bay, in the south part of Astoria. It will be of concrete, steel, tile and timber, and of the latest approved design.

The plant will be under the direct charge of Vance P. Edwardes, a chemical engineer and pulp specialist of many years' experience, both practical and technical.

W. E. Graves is auditor of the company, and when required, will be comptroller. He has also been associated with Mr. McBain from time to time for over twenty years. He has been mill manager of plants at Lebanon, Floriston and Camas.

The production of the new plan has been contracted to the Pulp and Paper Trading Company, 21 East 40th street, New York, dealers in pulp. J. Anderson, president of the Pulp and Paper Trading Company, has visited the site of the new plant at Astoria, and gave his approval of the surroundings and tentative plans.

The Northwest Pulp and Paper Company is an Oregon corporation, organized principally by business men interested in the future of Astoria as a port.

The directors and officers of the company today are: Chas. R. Flint, president; B. T. McBain, executive vice-president; A. V. Allen, vice-president; G. C. Fulton, secretary; Samuel Connell, treasurer and assistant secretary; Frank Patton, assistant treasurer; W. E. Graves assistant treasurer and auditor; C. W. King, chairman of board; directors: M. W. Robinson, Archimedes J. James, Daniel Mungall, H. C. Wechsler, C. S. Maltby, Robt. T. Jacob, Chas. W. Miller, W. M. Macphail, Amedee M. Smith.

Walker Elected President of Foremen's Club

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., April 30, 1928.—George K. Walker, superintendent of the paper mill of Finch, Pruyn and Company, was elected president of the Foremen's Club which is composed of executives and department heads of industrial concerns in Glens Falls and vicinity. Mr. Walker has been prominent in the organization for some time and 150 members of the club turned out for the election.

New York Trade Jottings

C. E. Dobson, secretary of the Southern Kraft Manufacturers Association, spent a few days in New York last week.

* * *

Maurice C. Dobrow, assistant secretary of the Writing Paper Manufacturers Association, was a New York visitor last week.

* * *

William B. Thom has recently been elected president and John A. Chew vice president in charge of sales of the new corporation formed by a consolidation of the Warner Chemical Co. and Westvaco Chlorine Products Corporation.

* * *

The Miller and Wright Paper Company, New York, are now located at 200 Varick street, in the new Graphic Arts Centre Building, where added facilities will better enable it to serve the requirements of its clientele.

* * *

The Farnsworth Company, of Conshohocken, Pa., has opened a New York office at 136 Liberty street, with A. L. Herrick as manager. Associated with Mr. Herrick in the sales of the products of the Farnsworth Company are A. A. Kiewitz, W. H. Caldwell and J. H. O'Connell.

* * *

The Consolidated Products Company, specialists in used chemical and paper machinery, has outgrown its present quarters on the 14th floor and is moving to an entire wing of the 16th floor of 15 Park Row, New York, where twice the office facilities will enable it to handle its increased business. In 1927, this company found it necessary to increase the facilities of its machine shop at its plant at Newark, N. J. This followed from a policy of overhauling and rebuilding every item of machinery before shipment, bringing a higher standard of quality in the used chemical machinery field and resulting in increased confidence by its customers and a definite assurance of repeat orders.

* * *

The Spaulding Pulp and Paper Company, of Newburg, Oregon, whose sole selling agents for their products are Perkins-Goodwin Company, of New York, report a most promising outlook for the future of their business. Their product has met with such a ready reception among users of unbleached sulphite that they are already planning the addition of a number of digesters to increase their production and intend also to install a bleaching system for the purpose of bleaching a portion of their pulp product. W. H. Donaldson, of the Perkins-Goodwin Company, in charge of their Pulp Department of this concern, is on his way to the Pacific Coast to consult with the Spaulding interests in connection with their increase of production.

E. G. Drew Opens Portland Office

E. G. Drew, for many years connected with the J. O. Ross Engineering Company and the John Waldron Corporation, has opened an office at 303 Lumbermens Building, Portland, Oregon. In addition to representing the J. O. Ross Engineering Corporation and the John Waldron Corporation, he will also represent on the Pacific Coast Smith & Serrel, and Nichols Products Corporation, all of whom are manufacturers of various types of equipment used in pulp and paper mills, such as heating and ventilating systems, air conditioning, temperature heaters, paper converting machinery, paint sprayers, etc.

Parker Makes Blotting, Not Writing

The article in last week's issue concerning the visit to Philadelphia of Louis H. McGreen, representing Joseph Parker & Son Company of New Haven, Conn., stated that this mill made writing papers. This was in error as the mill makes blotting and matrix papers exclusively.

Salesmen's News Print Luncheon

R. S. Kellogg, secretary of the News Print Service Bureau, cooperated with the luncheon committee of the New York Division of the Salesmen's Association of the Paper Industry in arranging the program of the luncheon and meeting which was held at the Canadian Club at the Hotel Belmont last Monday, April 30.

Dr. E. O. Merchant acted as chairman in an efficient manner and introduced the speakers. Mr. Kellogg ably demonstrated a chart showing the per capita consumption of the various grades of paper over a period of years, with special emphasis on news print.

S. F. Weston, newspaper engineer, took as his theme, "What the Publisher Thinks of the News Print Salesman," and gave a very interesting and instructive address. He referred to the necessity of the publisher and the salesman understanding each other's problems and declared that the publisher was mostly concerned with the right sources of supply, the dependability of the mill and the quality of service.

W. G. MacNaughton, of the News Print Service Bureau, followed, and in the course of an informative talk which was thoroughly appreciated, said that it was the duty of the news print salesman to keep his customer happy. He expressed the opinion that the salesman should have some knowledge of the use paper is put to in the press room and the results obtained, and declared that knowledge of the mechanical problems of the publisher would increase his efficiency and prestige.

Henry A. Wise, recently elected president of the Canadian Newsprint Company, Ltd., also made a few pertinent remarks.

The next luncheon of the New York Division of the Salesmen's Association of the Paper Industry on Monday, May 7, will be devoted to an analysis of the past six weeks' accomplishments and a discussion of plans for the future, not only in regard to luncheons, but also as to other activities. Chairman Nickenig, of the Diagnosis Committee, will submit a further report analyzing progress to date and offering recommendations for the future.

A New Forestry Laboratory

Announcement is made by Dean Franklin Moon of the New York State College of Forestry, Syracuse University, that a group of this year's senior class will receive instruction at the Pack Demonstration forest from April 28 to June 2, situated near Lake George in the heart of the finest pine region of the State.

This forest was given to the College about two years ago by the Charles Lathrop Pack Forestry Trust for the purpose of serving as a Demonstration Forest and Research area combined. Being located on the main highway from Albany to Montreal the roadside demonstrations in field reforestation and underplanting, thinnings to accelerate growth, pruning of young pines to improve the quality of the timber, can be observed by the thousands of tourists who pass this "show window" forest each year.

This spring the 28 seniors, spending the last five weeks of their college career upon the Pack Forest, will here receive their final polish in field methods. In addition to the practical work in surveying, timber estimating, they will for the first time lay out a "working plan" for the administration of the forest for the next 80 years. In addition to the regular staff of instructors, foresters from Denmark and Switzerland will conduct research and assist in instruction during the Senior Camp period.

In giving this 2400-acre tract to the College, Charles Lathrop Pack of Lakewood said, "I believe that every forest school should have an accessible piece of forest upon which the successful practice of forestry can be made plainly visible to the traveling public. It should be a show window and laboratory combined."

In addition to the benefit which the students will derive from the use of this forest laboratory, the forestry movement will have its store of knowledge increased and the citizens of New York who pass the Pack Forest by the hundreds of thousands each year will have a practical demonstration of successful forestry growing before their eyes.

PAPER TRADE JOURNAL
ESTABLISHED 1872

Henry J. Berger
Editor

Ronald G. Macdonald
Editor Technical Section

Herbert J. Laughton
Assistant Editor

Thomas J. Burke, C. A.
Editor Cost Section

Reginald Trautschold, M. E.
Power Engineering Consultant

Member A. B. C. Audit Bureau of Circulations

Vol. LXXXVI New York, May 3, 1928 No. 18

SUMMER TRAINING

The rapid advances in industry during the decade since the Great War have caused an unprecedented demand for technically trained men. As a consequence of this, the paper and pulp industry has had to compete for her men with other bigger, more alert and more thoroughly organized industries.

Canada, realizing the value of keeping her trained men in home industries, has organized the Technical Service Council and is raising a fund of $30,000 since "Today we are doing almost everything possible to educate our Canadian youth along technical and scientific lines but as yet we have made no provision for the prompt and practical utilization of that training and knowledge in Canadian industry."

Just a year ago the Technical Association of the Pulp and Paper Industry, appreciating the importance of this problem to the paper and pulp industry, appointed a committee to prosecute some practicable plan for absorbing promising men into the industry. This committee outlined and has presented to the industry such a plan.

Repeated briefly, the committee has divided the pulp and paper district of the United States into nine areas and has placed a member of the committee in charge of each area. This area director has made arrangements with high-class schools in his area to furnish promising students for summer work in the pulp and paper mills. It is the suggestion that these men be placed in laboring positions at the going rate so that they may have an opportunity to become familiar with the operating conditions in our industry. At the same time the mill will be able to size up the man as a future prospect, either for its own organization or for the industry as a whole.

This is what is called "getting them young;" starting with men from the Freshman year up—a system which is apparently more comprehensive than that employed by any other industry.

That is the plan. The committee members have worked diligently to further it; the schools have given their full support; many of our leading mills are operating under this arrangement. But a majority of the progressive companies must enter into some such plan if the greatest future benefits are to be secured from it.

The purpose of this editorial, which is printed at the suggestion of Mr. Allen Abrams, chairman of the committee on Training. for the industry of the Technical Association of the Pulp and Paper Industry of Rothschild, Wis., is to enlist from the mills active support for the director in their Area. If the mill already has arrangements for taking on certain men in the summer the committee would like to have them listed and included in this cooperative plan. When the roll of cooperating mills and schools is published it is expected to show a list which will be an impressive argument for the soundness of this idea.

Mr. D. Clark Everest, president of the American Paper and Pulp Association, said of this plan in his annual address, "Their present effort to excite interest in students in the various colleges and universities to train for the pulp and paper industry, will, I believe, prove of great benefit and will help to improve the personnel of our organizations."

Let every employer of technical men look far enough into the future of his company and of his industry to grasp the significance of this idea; and let him then act as his sound judgment may indicate!

CONFUSION SHOULD BE AVOIDED

Some confusion has been caused in the paper industry, it is understood, through the sending out of communications by the Paper Laboratory of the Bureau of Standards, asking the paper trade to certify that they are complying with government paper specifications.

The confusion has arisen, it is believed, because the specifications sent out by the Bureau are those which have been adopted by the Federal Specifications Board through its paper committee. These specifications are not the same, that is they have not been brought up to date, with those used by the Joint Congressional Committee on Printing.

As the result of this situation it is understood that General Lord, Director of the Budget, has been asked to abolish the paper committee of the Federal Specifications Board but no official action has been taken up to this time.

F. P. Veitch, of the Department of Agriculture, is chairman of the paper specifications committee of the Federal Specifications Board and also of the specifications committee of the Joint Congressional Committee on Printing. Dr. Veitch has stated that he knew that there had been some confusion and that there was a movement on foot to abolish the paper committee of the Federal Specifications Board but he stated that it had not yet been done to his knowledge. Inasmuch as most of the paper purchased by the government is bought through the Government Printing Office it should simplify matters considerably if the Specifications Board committee is abolished as then all specifications will be those issued by the Joint Congressional Committee on Printing.

FOREST TAXATION INQUIRY

With the conclusion this spring of the fact-finding investigation which has been under way in the Lake States by the United States Forest Taxation Inquiry, investigative work is to be opened up in additional States, according to Fred Rogers Fairchild, professor of political economy at Yale University, and Director of the Forest Taxation Inquiry.

Preliminary work in preparation for the gathering of field data in the two or three states next to be studied, and possibly the beginning of field work in the New England region is contem-

plated. In June, the field investigation of the Pacific Coast region, with Oregon as the key State, will begin.

The Forest Taxation Inquiry is being conducted under the terms of the Clarke-McNary Law. The work was opened in Minnesota in 1926, and a large amount of valuable data has been collected in the three Lake States, with the cooperation of local interests. In a progress report on the Inquiry, just issued, Professor Fairchild states that the research project of the Inquiry is national in scope and its plan of study contemplates field investigations in each of the more important forest regions of the United States.

"Since each State has a financial and taxation system of its own," he says, "it is necessary to make the State the primary unit of the study. First of all there is gathered material sufficient to present a clear picture of the financial structure and tax system of the State as a whole, including a general view of the finances and taxation of its countries, towns or townships, and other local subdivisions. Thereafter selection is made of certain counties or towns for special intensive investigations, intended to bring to light all objectionable facts bearing upon the tax situation with special reference to forest property.

"In all of this, the aim is to acquire a broad foundation of facts relating to the whole financial system, by no means limited to those taxes only which are imposed upon the forests. Forest taxation can not be successfully studied unless the taxation of forests is fitted into its proper place in the whole picture of State and local revenues and expenditures."

Professor Fairchild emphasizes that the inquiry at present is strictly a fact-finding organization. The time for conclusions and recommendations, he says, will come later.

Union Officials Address Paper Makers

ALBANY, N. Y., April 30, 1928.—Approximately 100 representatives of papermaking unions in Northern New York were present at the Northern New York district conference of papermakers held yesterday in Deferiet. The conference was addressed by a group of international union officials, including William R. Smith, president of the International Brotherhood of Papermakers; John P. Burke, head of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers; John Flynn, International president of the carpenters; J. J. McEntee, head of the machinists; Joseph Dowling, of the electricians, and Edward Magin, of the firemen's union. Sunday's meeting in Deferiet was followed by a banquet in the evening at Herrings.

The district conferences have been held in Northern New York annually for the past three years, having been inaugurated in 1925 through the efforts of Arthur Huggins, now secretary of the International Brotherhood of Papermakers with headquarters in this city. The purpose of the conferences is to bring together representatives of the numerous local unions in northern New York for a general discussion of union matters and conditions in the various towns.

Diana Paper Co. Appeal Heard

UTICA, N. Y., April 30, 1928.—Federal Judge Frederick H. Bryant, of the Northern New York District, at a recent session in this city heard arguments in the appeal of Attorney C. A. Phelps, of Watertown, representing Daniel B. Schuyler, trustee in bankruptcy of the Diana Paper Company, of Harrisville, from the allowance granted Brown, Brown & Co., by Referee John Conboy. After hearing the arguments Judge Bryant took the papers in the case and will give his decision later. Referee in Bankruptcy John Conboy, had allowed claims of Brown, Brown & Co., of the state of Maine, totalling more than $6,000, and it is from this allowance that Attorney Phelps, acting for the trustee and creditors, appealed.

To Build Demonstration Mill

SANDUSKY, Ohio, April 30, 1928.—The Paper and Textile Machinery Company will erect and equip a demonstration mill for the manufacture of paper, says the *Sandusky Register*.

Directors and stockholders recently discussed the project and authorized erection of the plant, to be located on the east side of dock property owned by the company at the foot of Lawrence street. It will be ready for operation within four or five months, officers said in making the announcement.

Flotation of an issue of 7 per cent preferred stock, totaling $750,000, was ordered, only $250,000 of which, however, will be used toward the mill, it was said.

Particular interest in the project is presented by the fact that improvements even more radical and important than those now employed generally by the industry—and which also had their "birth" in Sandusky—will be incorporated in the mill.

W. H. Millspaugh, president of the company, and his engineers have been responsible for numerous outstanding developments during recent years, in machinery for the manufacture of news print and other papers, among these the Millspaugh suction roll, a feature which has gone far in making possible speedy production of paper in the United States and Canada.

Purpose of the mill will be to demonstrate to papermakers the most recent developments in methods and machinery, it was explained. One complete unit will be installed, capable of producing 10 to 12 tons of paper a day, if necessary. Between 1,500 and 2,000 feet of paper in a sheet 53 inches wide, can be produced each minute, depending upon drying and handling facilities.

Plans have been completed and work will be started immediately. Materials are on hand.

Representing as it will, the "last word" in complete papermaking machinery, one of the unit's most important features will be a newly patented "wet end," on which various kinds and grades of paper are formed and made, officers said. Driers and calenders, by the latter of which the paper is given its calender or gloss finish, will be incorporated, so that the finished product in any of several kinds of paper may be shown to those who may witness its operation.

Vacuum and stock pumps to be used in the machine will be manufactured in the Paper and Textile Machinery Company's own No. 2 plant. Other novel features, including a new drive, designed and built by the engineers of the concern, will be employed, and all suction rolls and tubular parts will be of the company's own make.

The mill will be operated by power from the company's own Water street plant; the buildings will be of steel and concrete construction, 44 x 200 feet in dimension and so erected that additional driers can be added, as and if required, to increase capacity.

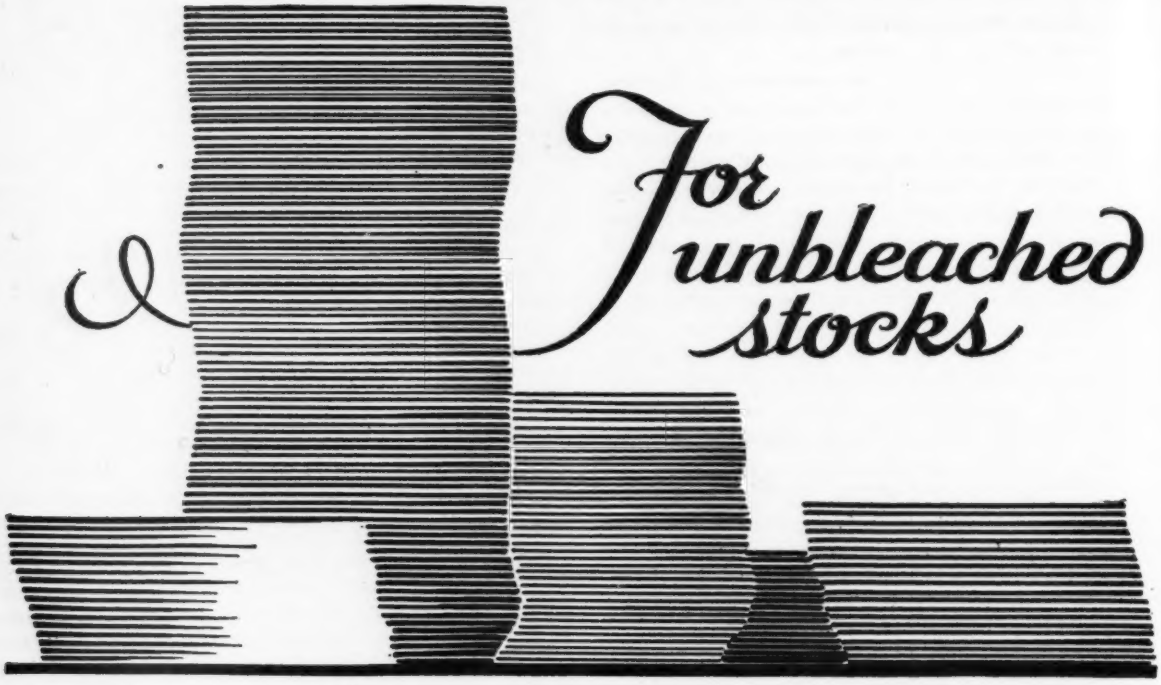
It is not the intention of the Sandusky concern to enter the paper making industry. Sole purpose in constructing the mill will be to afford facilities for demonstrating machinery used.

Of the $250,000 in 7 per cent stock to be issued, $150,000 will be used in retiring an issue of $150,000, 8 per cent, now outstanding. The old issue will be exchanged allowing a dividend of $2.50 per share, which has accrued.

A statement of the company's earnings, submitted to directors, showed a healthy growth and indicated that satisfactory conditions prevail. Business has expanded during the last several years, without regard to economic conditions which have at times affected other lines, officers said, following the meeting.

T. J. Burke Addresses Cost Experts at Holyoke

HOLYOKE, Mass., April 29, 1928.—Thomas J. Burke, secretary-treasurer of the Cost Association of the Paper Industry, spoke before the Connecticut Valley Branch at the Hotel Nonotuck, Thursday night, on "Planning for Profit." A discussion of considerable length followed his talk.



KALBFLEISCH WOOD ROSIN SIZE

is the equal of more expensive Gum Rosin Size

WHY not economize on Size? Where there is not the least sacrifice of high class results. It can be done on unbleached stocks by the use of Kalbfleisch Wood Rosin Size. If the paper does not have to be an absolute white this Size gives results equal to the more expensive gum Size.

There is no comparison as to price—both as to amount or stability. Wood Rosin Size is *always* appreciably lower in cost. Furthermore its price does not fluctuate as much as do gum Size prices.

Kalbfleisch Wood Rosin Size may be used with assurance. It represents unexcelled quality in its field, a characteristic shared by all Kalbfleisch products for paper makers.

Other Kalbfleisch Chemicals are—

ALUM *both Commercial and Iron Free* · CASEIN *Domestic and Imported* · ROSIN SIZE · AMMONIA · SALT CAKE · CHINA CLAY · SODA ASH · MURIATIC ACID · SULPHURIC ACID · NITRIC ACID · SATIN WHITE · SULPHATE OF SODA · GLAUBER'S SALT

KALBFLEISCH CHEMICALS & SERVICE *for* PAPER

The KALBFLEISCH *Corporation*

200 Fifth Avenue, New York, N. Y.

Plants: ERIE, PA. · KALAMAZOO, MICH. · CHATTANOOGA, TENN.

Plants: ELIZABETH, N. J. · DE QUINCY, LA. · WATERBURY, CONN.

Section of the
Technical Association of the Pulp and Paper Industry

AN ORGANIZATION FOR THE ENCOURAGEMENT OF ORIGINAL INVESTIGATION AND RESEARCH WORK IN MILL ENGINEERING AND THE CHEMISTRY OF PAPER, CELLULOSE AND PAPER-MAKING FIBERS GENERALLY; IT AIMS TO PROVIDE MEANS FOR THE INTERCHANGE OF IDEAS AMONG ITS MEMBERS IN ORDER THAT PROCESSES OF MANUFACTURE MAY BE MADE MORE EFFICIENT AND IMPROVED ALONG TECHNICAL LINES.

Edited by
RONALD G. MACDONALD, Secretary

Paper For Blue Prints

By Frederick Grove-Palmer [1]

There are several important features in the quality of paper that is intended for the use of engineers and others in the making of their blue prints. Among the more prominent of these may be included its ability to withstand the constant folding and bending that the plans must undergo as a result of their use, and also the tensile strength of the paper when it is made wet during its various processes in being made into such a plan. Not only is it necessary for the paper to be strong enough to come through the field-work without great damage but there is also the need for it to last many years in storage in the form of permanent records in the drafting office.

In the preliminary treatment great tensile strength is necessary for it must stand much rough handling before it is ready for the drawer in the engineer's cabinet. There is the sensitizing and subsequent drying which is followed by the development in which there is a further wetting and drying, and when it is remembered that in big jobs there are sometimes extremely large sheets of paper measuring three and even four yards in length, the paper must of necessity have a very considerable inherent strength to be able to sustain its own weight when it is thoroughly soaked in water.

Permanence Considerations

It is customary to manufacture three grades of paper for the production of blue prints. The two higher grades are bond paper of the best qualities which are usually manufactured from the finest types of rag fiber only; such papers as these are the ones that are used for making the prints for permanent record and for the exceptionally fine work. The well picked rag stock that is employed in the manufacture of these high grade papers must be well pulped and beaten, and it requires a definite amount but not any excess of size to produce a serviceable, flexible paper with an even, close texture. If it is in any way open in formation it will permit of an over-absorption of the sensitizing chemicals and any tendency to mealiness would be liable to mar the finest lines of the drawing and prevent them from being easily read when the drawing is in use.

There are, however, in ordinary commercial work a considerable number of plans and prints of all kinds which are not made to be permanent as their value is only of temporary interest; for such as these the third grade of paper is amply good enough. A paper of this type will contain a certain quantity of good rag pulp but there will also be additions of as much as fifty per cent of other pulps, such as esparto, sulphite or even straw.

It is very important to remember that in the manufacture of these kinds of paper, that the amount of sizing is to be very carefully graduated so as to bring the surface to that degree of semi-imperviousness that will permit it to retain a sensitizing coat only on the surface and not permit it to soak into the fiber. Paper which has been improperly made in this respect has a dirty appearance due to penetration of the color through the sheet. While every care is being exercised in this direction, the same care must be taken not to go to an extreme in the other direction, for if the sizing is too great the sensitizing coat will go on patchily and there will be an absence of uniformity that will make the paper useless.

Sensitizing Formulas

Over a long period of time there does not appear to have been very many changes in the formulas used for preparing the solutions for sensitizing papers. Manufacturers generally have found that the old researches covered the ground very well and gave us the best commercial formulas. Following is a typical formula:

Potassium Ferricyanide—1 pound; Ammonio-citrate of Iron—1 pound: Water—4.12 pounds.

Small amounts of gums, gelatines, or other colloids are also added the amount of which varies with the amount of sizing that is present in the paper.

Physical Properties

The ability of papers of this kind to resist the wear and tear of rough usage is determined by means of the folding test, and it is usual to apply this only in the weakest directions.

In making the folding test it is not sufficient merely to do it on the new paper; it is necessary to have testpieces sensitized, exposed to the light, developed, and then tested for folding endurance. By a comparison of the folding-resistance of the batch of paper before and after use, the fall in strength may be noted and if the weakening is considerable it shows that imperfections are present in the sheet. As a matter of fact the paper should be just as strong after treatment as it is before and this is found to be the case with all the better grades.

In determining the kind of sizing material to be used it is well to remember that rosin is unsatisfactory when it is used in the manufacture of paper that is to undergo a severe folding-test. It is found to detract from its powers of resistance. Irrespective of the material that is used for sizing, it should never be present to a greater extent than three per cent of the weight of paper. In a great number of tests that have been carried out with a view to discovering the best sizers, nothing has been found to be superior to glue or gelatine of good quality. It should also be borne in mind that the sizing coat should not be too highly glazed, for if it is there

[1] London, England.

will be a danger of getting uneven sensitization and the folding test curve will be irregular.

The tests of the tensile strength of the paper when it is wet are carried out upon slips which measure ten centimeters in length and fifteen millimeters in width and which have been soaked for twenty-minutes in water at 70 deg. F. Repeated trials and observations have shown that there is not always any strict correlation between the wet tensile strength of a paper and its fold-resistance, but there is always a relation between its bursting test and fold-resistance.

In standard practice, the specification for coated blue-print papers of the three grades is to be found in the tables of Veitch, Sammet and Reed (the figures refer to papers which are of medium thickness in sheets measuring 17 by 22 inches, 500's—24-lb.):

Grade No.	Rag Stock %	Bursting Test points	Wet Strength Longitudinal grms.	Wet Strength Transverse grms.	Folding Test Weak direction double folds
1	100	50	800	500	800
2	100	45	800	500	500
3	50	38	800	500	150

Undoubtedly a considerably stronger paper could be, and indeed has been made. If there was a real market for it and users were ready to pay a greater price for it such a paper would be made from a stock in which mulberry pulp is blended with other materials. There should be no difficulty in obtaining the raw stuff for this as it is a product of all the silk producing countries, and the large trade that this country has with Japan, for instance, in the way of importation of reeled silk, would enable us to import also quantities of mulberry pulp. The Japanese are fully aware of the value of the waste mulberry wood and make it into paper for a number of purposes, consequently the price of it is high, but on the shores of the Mediterranean and in Asia Minor, also silk-raising countries, the prunings are only used for fuel and could be purchased cheaply. But there is another way in which vast quantities could be obtained: the tests made by experimenters with a view to ascertaining if silk could be produced in the United States have shown that there are many places between Virginia and Texas and also in California where mulberry trees may be grown quite successfully, and even if they were never used for silk-culture there is a prospect of their being useful for paper manufacture, and to have this cheap native source of supply of the finest material for making strong paper would be a decided advantage.

In preparing blue-print paper it will be necessary to conduct some research in order to find out the ideal finish to give the necessary surface, inasmuch as in the Japanese mulberry papers the surface is far from being that required for blue print requirements, but this is largely due to rather crude methods of beating. A pure rag stock with a comparatively small addition of mulberry pulp would give an ideal paper for blueprint purposes. The modern processes of pulping corn straw have shown its value as a commercial product, and it can be used for lowering the cost of paper for blueprints without materially decreasing its durability and the strength of the material produced.

New Oswego Mill In Operation

[FROM OUR REGULAR CORRESPONDENT]

OSWEGO, N. Y., April 30, 1928.—The newly constructed mill of the Taggart-Oswego Paper and Bag Company is now in operation, it was announced by Corwin T. Jewell, general manager of the St. Regis Paper Company, and associated concerns. The first machine was started in the new mill last Wednesday. It was stated that production will be light for a short time but it is expected that the plant will be operating at full capacity within a few weeks. Ralph Maltby, vice president and a member of the board of directors of the St. Regis Paper Company, visited the new Oswego plant this week on a tour of inspection of the St. Regis properties. He also inspected the St. Regis plants in Watertown and other places in Northern New York.

M. I. T. Leads in TAPPI Membership

About six hundred members of the Technical Association hold college degrees. It is interesting to note that the leading technical schools are the major source of supply of managers, superintendents, engineers and chemists for the paper industry. Following is the list of colleges represented in TAPPI membership together with the number of members therefrom:

Massachusetts Institute of Technology	51
Maine, University of	33
Cornell University	24
Wisconsin, University of	24
McGill University	20
Michigan, University of	20
Harvard University	15
New York State College of Forestry	15
Pennsylvania State College	13
Royal Technical Institute (Sweden)	13
Ohio State University	11
Minnesota, University of	10
Toronto, University of	10
Columbia University	9
Yale University	9
Dartmouth	8
Pennsylvania, University of	8
Worcester Polytechnic Institute	7
Darmstadt, University of	6
Lawrence	6
Michigan State College	6
Pratt Institute	6
Queen's University	6
Armour Institute of Technology	5
Purdue University	5
Syracuse University	5
Tufts	5
Chalmers Technical College (Sweden)	4
Cincinnati, University of	4
Clarkson	4
Lowell Textile School	4
Manchester, University of (England)	4
Oerbro Technical College (Sweden)	4
Princeton University	4
Stuttgart Engineering College (Germany)	4
Technical University of Finland	4
Tekniske Skoele (Oslo)	4
Amherst	3
Bates	3
Battersea Polytechnic Institute (England)	3
British Columbia, University of	3
Brown University	3
Charlottenburg, University of (Germany)	3
Haverford	3
Heriot-Watt (Scotland)	3
Illinois, University of	3
Lehigh University	3
New Hampshire, University of	3
Norrkoping Technical College (Sweden)	3
Swarthmore	3
Union	3
Bowdoin	2
Bury Technical Institute (England)	2
California, University of	2
Case School of Applied Science	2
Christiania, University of (Norway)	2
Clark University	2
Cothen Polytechnic Institute (Germany)	2
Drexel Institute	2
Gettysburg	2
Hamilton	2
Lewis Institute	2
New Brunswick, University of	2
Northwestern University	2
Rensselaer Polytechnic Institute	2
Rochester, University of	2
Royal Technical College (Norway)	2
Stevens Institute	2
Technische Hochschule (Berlin)	2
Technische Hochschule (Darmstadt)	2
Tri-State College of Engineering	2
Valparaiso University	2
Virginia Polytechnic Institute	2
Washington and Jefferson	2
Acadian University	1
Alabama Polytechnic Institute	1
Berea	1
Bergen Technical School (Norway)	1
Berlin College (Germany)	1
Brooklyn Polytechnic Institute	1
Brussels, University of	1
Bucknell University	1
Buffalo, University of	1
California Institute of Technology	1
Central Technical College (London)	1
Chihli Technical College (China)	1
City College of New York	1
Clemson	1
Colby	1
Colgate University	1
Cooper Union	1
Copenhagen Polytechnic (Denmark)	1
Delaware, University of	1
Denison University	1
Denver, University of	1
DePauw University	1
Drury College	1
Fairmont	1
Franklin Union	1
Fridrische Statishe Polytekнickum	1
George Washington University	1
Grenoble, University of (France)	1
Grinnell	1
Harnosand Technical College (Sweden)	1
Heidelberg, University of	1
Helsingfors, University of	1
Hobart	1
Holy Cross	1
Hunter	1
Kansas State Agricultural	1
Kansas, University of	1
Karlsruhe Technical University (Germany)	1
Katrineholm Technical School (Sweden)	1
Kentucky, University of	1
Leipzig, University of	1
London, University of	1
Loyola	1
Madras University	1
Marburg	1
Massachusetts College of Pharmacy	1
Mittweida (Saxony)	1
Mount Allison	1
Muenchen and Tuebingen, University of	1
Nebraska, University of	1
Nevada, University of	1
New York University	1
North Carolina, University of	1
North Dakota, University of	1
Northeastern University	1
Norwich University	1
Ohio Northern University	1
Oregon Agricultural	1
Oregon, University of	1
Parsons	1
Prague, University of	1
Ripon	1
Royal Technical Institute of Salford (England)	1
Saechsische Technische Hochschule (Dresden)	1
St. John's University	1
St. Olaf	1
Smith	1
Southern Normal University	1
Stetson University	1
Strangnas College (Sweden)	1
Technicum Burgdorf (Switzerland)	1
Texas, University of	1
Thiel	1
Trinity	1
Trondjheim University (Sweden)	1
Troy Polytechnic Institute	1
Upper Canada College	1
Upper Royal Technical College (Germany)	1
Vienna Technical College	1
Virginia, University of	1
Wabash	1
Washington and Lee University	1
Washington, University of	1
West Virginia, University of	1
Willamette University	1
Williams	1
Wooster, College of	1

The Chemistry and Technology of Cellulose*

Ralph E. Montonna[1]

During the past five years, a rather extensive examination of the literature relating to the chemistry and technology of cellulose has been made in developing a graduate course in this subject. It seemed possible that a brief review of the more important publications covering this whole field might be desirable to specialists in some portion of it or of other fields who might desire to review either the scientific background of their own raw material or the technology of related industries.

About five hundred references have been included from the very large number which were examined. These have been chosen on the basis, first, of their importance, and, second, of their probable availability. No claim is made that the list of references is in any way complete. Many contributions of importance have undoubtedly been omitted, unintentionally or otherwise, and the value of some which have been included may be questioned but indulgence must be asked in this pioneer attempt to review so large and comprehensive a field. A few references have been included which are not generally available except through abstracts because they were thought to be of sufficient importance in certain fields to justify mention. No review of the pulp and paper industry is included because it seems likely that the readers of this journal probably already possess much more extensive bibliographies than could be included here. The wood distillation industry has also been omitted for two reasons, first, because the subject has beeen so excellently yet concisely treated by L. F. Hawley in his American Chemical Society Monograph (Wood Distillation, 1923, Chemical Catalogue Co., Easton, Pa.) and, second, because, due to the encroachments of synthetic organic chemistry into the field of this industry, its future status and development seem uncertain.

Books on Cellulose Chemistry

There are many excellent books dealing in more or less comprehensive manner with parts of this field. Among the older ones which still contain much interesting material for reference may be mentioned those by Schwalbe (Chemie der Cellulose, 1911, Gebr. Borntraeger, Berlin), by Cross and Bevan (Cellulose, 1918, Longmans, Green and Co., London; Researches on Cellulose, 1901, Vol. I, 1895-1900; 1906, Vol. II, 1900-1905; 1911, Vol. III, 1905-1910, Longmans, Green and Co., London) and a later volume by Cross and Doree (Researches on Cellulose, 1922, Vol. IV, 1910-1921, Longmans, Green and Co., London). Hall (Cotton Cellulose, 1924, Ernest Benn, Ltd., London) has treated the subject more from the textile viewpoint. An excellent book on the scientific aspects of cellulose chemistry is that of Heuser (Textbook of Cellulose Chemistry, translated by West and Esselen, 1924, McGraw-Hill Co., New York). This is supplemented by two excellent books, one by Schorger (Chemistry of Cellulose and Wood, 1926, McGraw-Hill Co., New York) and one by Wise and Hawley (Chemistry of Wood, 1926, Chemical Catalogue Co., Easton, Pa.)

A somewhat different view is given by Chaudhuri (Modern Chemistry and Chemical Industry of Starch and Cellulose, 1918, Butterworth and Co., London and Calcutta). Various phases of cellulose technology are covered by Worden (Nitrocellulose Industry, 2 vols., 1911, Cellulose Esters, 1916, D. Van Nostrand Co., New York), Wilson (Pyroxylin Enamels and Lacquers, 1926, D. Van Nostrand Co., New York), Avram (Rayon, 1927, D. Van Nostrand Co., New York), Sproxton (Cellulose Ester Varnishes, 1925, Ernest Benn, Ltd., London), and Hawley (Wood Distillation, loc. cit.).

Classification of Polysaccharides

A brief general review of carbohydrates is found in Bernsthen's (Textbook of Organic Chemistry, translated by Sudborough, 1922, D. Van Nostrand Co., New York, p. 308). An excellent definition and classification of polysaccharides is given by Hans Pringsheim (Die Polysaccharide, 1923, Julius Springer, Berlin, p. 2) and further on (p. 3) he gives five points which must be determined in order to characterize a polysaccharide molecule.

1. The kind of constituent sugars. For a discussion of the individual sugars and their constitution attention is directed to Houben-Weyl (Die Methoden der Organische Chemie, 1923, G. Thieme, Leipzig, Vol. III), to E. Frankland Armstrong (The Simple Carbohydrates and the Glucosides, 3rd Ed., 1921, Longmans, Green and Co., London) and to Emil Fischer (Untersuchungen ueber Kohlenhydrate und Fermente, 2 vols., Julius Springer, Berlin). In the latter volumes the masterly researches of this great chemist are presented in a way which shows the romance of scientific investigation.

2. Polysaccharide types—the hydroxyl groups through which the individual constituents are coupled. This point is well discussed by Pringsheim (Die Polysaccharide, loc. cit. p. 5).

3. The position of the inner oxide ring in each sugar.

In cellulose chemistry we are concerned only with glucose. It seems logical to adopt the new nomenclature proposed by Schulbach and Rauschalles (Ber. 58, 1842 (1925)) which designates the form of sugars ordinarily occurring, as n-sugars, and those very reactive forms having different rings, which Fischer unfortunately called γ-sugars, as h-sugars (the h taken from hetero = different). This nomenclature is being adopted by German chemists although it has not come into general use among others.

Tollens (Ber. 16, 921 (1883)) first proposed a lactone structure for glucose. Reasons for a cyclic structure have been tabulated by Fischer (Ber. 45, 461 (1912) see footnote); Armstrong (J. Chem. Soc. 83, 1305 (1903)) and Lipmann (Die Chemie der Zuckerarten, 3rd Ed., 1904, F. Viewig und sohn, Braunschweig, Vol II, pp. 1675-1722). Confirmatory evidence of the ring structure of glucose is found in Fischer's discovery (Ber. 47, 1980 (1914)) that there were α- and β-isomers to the methyl-h-glucosides. Nef (Ann. 403, 331 (1914)) had considered the glucosides as structural isomers. Perkin (J. Chem. Soc. 81, 177 (1902)) deduced a lactonic structure for glucose from its magnetic rotation. Analogy with other substances led to the belief that the ring was a γ-lactone. Such studies as the work of Helferich (Ber. 52, 1123, 1800 (1919)) on the ease of formation of γ- and λ-hydroxy lactones, the work of Fischer, Bergmann and Rabe (Ber. 53, 2362 (1920)) and Bergmann and Beck (Ber. 54 1576 (1921)) on the lactones of rhamnose and finally the researches of Bergmann and Mikeley (Ber. 54, 2150 (1921)) on the lactones of Glycollic aldehyde strengthened this analogy as did three other papers dealing with bridged structures and their properties (Bergmann, Schotte and Lechinsky, (Ber. 55, 58 (1922)); Bergmann and Mickeley, (Ber. 55, 1390 (1922)); and Helferich, (Ber. 55, 702 (1922)).

By his studies of the rotation of sugars Hudson (J. Am. Chem. Soc. 31, 66 (1909); 32, 345 (1910); 48, 1434 (1926)) concluded that glucose had a ring structure of the γ-lactone type. Purdie and Irvine (J. Chem. Soc. 83, 1021 (1903)) and Irvine and Cameron (J. Chem. Soc. 87, 900 (1915)) by methylating α- and β-methyl glucosides and then hydrolyzing obtained the same tetramethyl glucose showing that these isomers contain the same ring and since it gave no ozone Isvine and Scott (J. Chem. Soc. 103, 575 (1913)) concluded it was not an α-oxide ring. Denham and Woodhouse (J. Chem. Soc. 111, 244 (1917)) came to the same conclusion because a trimethyl glucose (believed by them to be 2-3-6-trimethyl glucose) gave no osazone but did give the same tetramethyl glucose on further methylation. Freudenberg and

* Contribution from the Division of Chemical Engineering, School of Chemistry, University of Minnesota.
[1] Assistant Professor Chemical Engineering, University of Minnesota.

Doser (Ber. 56, 1243 (1923)) concluded that the ring cannot be a 1-3 ring because a certain monomethyl glucose, obtained from diacetone glucose, and believed by them to be 3-methoxy glucose, gave the same tetramethyl glucose (supra) on further methylation. See also a paper by Levene and Meyer (J. Biol. Chem. 60, 173 (1924)) for the structure of this monomethyl glucose. The 1-6 ring is excluded because this tetramethyl glucose does not oxidize to a tetramethylsaccharic acid with nitric acid although Smolenski (Chem. Abstr. 19, 41 (1925)) found that the methyl glucosides readily oxidized to methyl glucuronic acid under the same conditions. Trimethyl glucosan also gives the same tetramethyl glucose on further methylation (Irvine and Oldham, J. Chem. Soc. 127, 2729 (1925)) which is an additional proof against the 1-6 ring.

Haworth (Nature 116, 430 (1925)) first proposed the 1-5 ring (amylene oxide) on theoretical grounds. The first proof of the 1-5 ring was offered by Charlton, Haworth and Peat (J. Chem. Soc. 129, 89 (1926)) from their study of the rates of mutarotation of the methylated lactonic acids. Hirst (J. Chem. Soc. (1926) 350) oxidized tetramethyl glucose and from the oxidation products concluded that the ring could not be 1-2, 1-3, or 1-4 but must be 1-5. Drew and Haworth (J. Chem. Soc. (1926) 2303) deduced further support for the 1-5 ring from rotational data. Additional evidence for the amylene oxide structure is given by the work of Ohle and Spencker (Ber. 59, 1836 (1926); Schulbach and von Bomhard (Ber. 59, 845 (1926)); and Micheel and Hess (Ann. 449, 146 (1926); 450, 21 (1926)). The earlier ideas of Irvine, Fyfe and Hogg (J. Chem. Soc. 107, 524 (1915)) on the structure of h-glucose have been changed (Irvine, Chem. Rev. 1, 41 (1924)). That Irvine now tends toward the amylene oxide structure may be seen in more recent papers such as his second review of polysaccharide structures (Chem. Rev. 4, 203 (1927)); his researches on the structure of maltose (Irvine and Black, J. Chem. Soc. (1926) 862); or of starch (Irvine and McDonald, J. Chem. Soc. (1926) 1502). Haworth and Hirst (J. Chem. Soc. (1926) 1858) have discussed the structure of fructose, h-fructose and sucrose in the light of the 1-5 ring. Pringsheim and Kolodny (Ber. 59, 1135 (1926)) and Pringsheim and Beise (Ber. 59, 224 (1926)) have discovered a new and remarkably stable form of h-glucose which they conclude possesses a 1-6 ring.

4. The stereo-chemical form of the constituents. Fischer (Ber. 26, 2400 (1893); 28, 1145 (1895)) first introduced the idea of stereoisomerism into sugar chemistry to explain the existence of the α- and β-isomers of methyl glucoside. The discovery by Tanret (Bull. soc. chim. (3) 13, 625, 728 (1895); (3) 15, 195, 349 (1896); Compt. rend. 120, 1060 (1895)) of the free sugars corresponding to these glucosides and their mutarotation (Bull. soc. chim. (3) 33, 337 (1905)) which was followed by the work of Armstrong (J. Chem. Soc. 83, 1305 (1903)) on the action of definite ferments in splitting the glucosides to the free sugars gave strong support to the view. Fischer's classic researches (Ber. 24, 2683 (1891); 27, 3211 (1894)) by which he determined the spatial position of the OH-groups are all summed up in his book (Untersuchungen etc. loc. cit.). The relative position of the aldehydic OH-groups in the α- and β-isomers were only finally determined in 1920 by Pictet (Helv. chim. Acta 3, 649 (1920)).

5. The degree of polymerization of the building units.

The classical researches of Pringsheim (Z. angew. Chem. 35, 345 (1922)) and Karrer (Z. angew. Chem. 35, 85 (1922)) have shown us a great deal about the polymerization of starch and the similarity of this to cellulose and its polymerization is recognized and discussed in books by Heuser (loc. cit. p. 193) and by Wise and Hawley (loc. cit. p. 26) and also in a paper by Wise (Ind. Eng. Chem. 15, 711 (1923)). This point will be further considered under "Reactions and Relations of Cellulose—Relation of Cellulose to the cellulose nucleus."

Reactions and Relations of Cellulose

The first tabulation of the reactions of cellulose which must be explained by any formula was made by Green (Z. Farben. Ind. 3, 96, 309 (1904)), and this was much extended by Hibbert (Ind. Eng. Chem. 13, 256, 334 (1921)). The literature of twenty such characteristics will be considered.

1. Nitration. Vieille (Compt. rend. 95, 132 (1882)) gives data showing that the highest degree of nitration is to the trinitrate stage.

2. Acetylation. Cross and Bevan (J. Chem. Soc. 57, 2 (1890); 67, 435 (1895)) have claimed that they obtained a tetra-acetate of cellulose. This has been disproved, however, both by Green and Perkin (J. Chem. Soc. 89, 811 (1906)) and by Ost (Z. angew. Chem. 19, 993 (1906); Ann. 398, 323 (1913) footnote) who have showed that the triacetate is the highest derivative obtainable.

3. Alkali Cellulose. Gladstone (J. Chem. Soc. 5, 17 (1853)), Wickelhaus and Viewig (Ber. 40, 441 (1907)) and Viewig (Ber. 40, 3876 (1907); 41, 3269 (1908)) all claimed that each two C_6 units contained one mole of alkali. Rassow and Wadwitz (J. prak. Chem. 106, 266 (1923)) have claimed one mole of alkali per C_6 unit. More recent views on starch (Karrer, Helv. chim. Acta 4, 711 (1921)) and on cellulose (Gladstone and Karrer, Cellulosechemie 2, 126 (1926)) have verified the formula $(C_6H_{10}O_5)_2NaOH$. Hess (Z. angew Chem. 38, 230 (1925)) and Heuser et al. (Celluloschemie 6, 13, 19 (1925); 7, 169 (1926)) have summed up the opposing views for $(C_6H_{10}O_5)NaOH$ and $(C_6H_{10}O_5)_3NaOH$. Thiele (Chem. Zeit. 25, 610 (1901)) has discussed cellulose in the role of an alcoholate. But Huebner, Telscher and Lester (J. Soc. Chem. Ind. 28, 228, 230, 641 (1909)) have denied the existence of a definite chemical compound.

4. Viscose or Cellulose Xanthate. This ester was discovered by Cross, Bevan and Beadle (J. Chem. Soc. 63, 837 (1893)) and its chemistry has been discussed by them (Ber. 26, 1090, 2524 (1893); 34, 1513 (1901)). Blanco (Ind. Eng. Chem. 18, 1257 (1926)) gives a very thorough discussion of the chemistry of xanthates in general and viscose in particular.

5. Cellulose yields glucose quantitatively upon hydrolysis.

This was first stated by Flechsig (Z. physiol. Chem. 7, 523, 913 (1882)) and proved from polarimetric readings and reducing power by Ost and Wilkenning (Chem. Zeit. 34, 461 (1910)) and later by Ost (Ber. 46, 2995 (1913); Ann. 398, 313 (1913)). Willstaetter and Zechmeister (Ber. 46, 2401 (1913)) also obtained a 95 per cent yield of dextrose (shown by polariscope readings) after hydrolyzing cellulose with 41 per cent hydrochloric acid. But Cross and Bevan (J. Chem. Soc. 113, 182 (1918)) and Cunningham (J. Chem. Soc. 113, 173 (1918)) have objected to this proof on the ground that the glucose had not been isolated in a pure crystalline state. Monier-Williams (J. Chem. Soc. 119, 803 (1921)) first succeeded in accomplishing this with fair yield (90 per cent) by hydrolyzing according to the method of Ost. After Irvine and Soutar (J. Chem. Soc. 117, 1489 (1920)) had obtained an 85 per cent yield of crystalline glucose by acetylation, methylation and hydrolysis Irvine and Hirst (J. Chem. Soc. 121, 1585 (1922)) raised this figure to 95 per cent of theory.

6. Reaction of anhydrous HBr on cellulose gives w-bromomethyl furfural. This reaction was discovered by Fenton and Gostling (J. Chem. Soc. 73, 554 (1898); 75, 423 (1899); 79, 361 (1901)) and has been regarded of considerable importance by Cross and Bevan (Cellulose, loc. cit. appendix 334). But Hibbert and Hill (J. Am. Chem. Soc. 45, 176 (1923)) have obtained the same product from α-glucose, cellobiose and α-methyl glucoside.

7. Oxycellulose has been discussed by Cross and Bevan (J. Chem. Soc. 43, 22 (1883)) and in Henser's book (loc. cit. p. 90). The best recent work has been that of Hibbert and Parsons (J. Soc. Chem. Ind. 44, 473 (1925)) who performed controlled oxidations and studied the products obtained.

8. Isosaccharinic and Dioxybutyric acids from Oxycellulose by the action of hot milk of lime. This reaction was discovered by Tollens and Faber (Ber. 32, 2594 (1899)) and further studied by Murumow, Sack and Tollens (Ber. 34, 1432 (1901)). Schwalbe and Becker (J. prak. Chem. 100, 19 (1920)) showed that hydro-

cellulose gave the same reaction. For a discussion of the structure and reactions of the saccharic acids see Nef. (Ann. 357, 214 (1907); 376, 1 (1910)).

9. Nitrocellulose with dilute NaOH yields hydroxypyruvic acid. This reaction was discovered by Will (Ber. 24, 400 (1891)).

10. Relation of Cellulose to the Cellulose Nucleus. Hess (Z. Electrochem. 26, 232 (1920); Helv. Chim. Acta 3, 866 (1920)) has expounded the idea that the "bausteins" are united by partial valences. Staudinger (Ber. 53, 1073 (1920) disagrees with Hess and maintains all linkings are full valences. Karrer (Helv. Chim. Acta 3, 620 (1920)) has criticized Staudinger's views and has discussed the number of units polymerized to form the complex (Helv. Chim. Acta 4, 811 (1921); Cellulosechemie 2, 127 (1921)) which he designates as polymerization exponent (Z. angew. Chem. 35, 85 (1922)). Herzog has discussed this exponent (Cellulosechemie 2, 101 (1921); 6, 39 (1925)) in view of his X-ray studies. Katz (Cellulosechemie 6, 37 (1925)) has also studied the nature of the polymerization. Heuser (Z. Electrochemie 31, 498 (1925)) concluded that cellulose has a high molecular weight from studies on methylated cellulose and its degradation products but this work has been criticized by Hess (Z. Electrochemie 31, 613 (1925)) who claimed that Heuser's methylated products were not homogeneous and who, in support of his claim, prepared a crystalline trimethyl cellulose (Hess and Pichlmayr, Ann. 450, 29 (1926)).

Debye and Scherer (Physik Z. 17, 277 (1916); 18, 291 (1917)) first applied X-rays to the study of the crystal structure of fibrous materials. The most extensive study of cellulose by X-rays has been made by Herzog and his co-workers (Herzog and Jancke, Ber. 53, 2162 (1920); Z. angew. Chem. 34, 385 (1921)). Herzog (Pulp and Paper Mg. Can. 24, 694 (1926); Paper Trade J. 83, 51 (1926)) has reviewed his work rather thoroughly. A most excellent paper on the X-ray crystal structure of ramie cellulose and the cellulose molecule is that of Sponsler and Dore (Coll. Symp. Monograph 4, 174 (1926)). Ott (Helv. Chim. Acta, 9, 31, 378 (1926)) and Herzog (Helv. chim. Acta 9, 631 (1926)) have studied the X-ray crystal structure of cellulose acetate.

11. Cellulose Yields 2-3-6 trimethyl glucose on exhaustive methylation and hydrolysis. The complete methylation of cellulose was first attained by Denham and Woodhouse (J. Chem. Soc. 103, 1735 (1913); 105, 2357 (1914); 111, 244 (1917)). Haworth and Leitch (J. Chem. Soc. 113, 188 (1918)) offered additional proof that the sugar produced by hydrolysis of completely methylated cellulose was 2-3-6-trimethyl glucose. Finally Irvine and Hirst (J. Chem. Soc. 121, 1213 (1922); 123, 518 (1923)) obtained a 92 per cent yield of this sugar showing that it was the *only* methyl glucose produced.

12. Cellulose yields cellobiose—octaacetate upon acetolysis. The constitution of this disaccharide has been elucidated by the work of Haworth and Leitch (J. Chem. Soc. 115, 813 (1919)) and Haworth and Hirst (J. Chem. Soc. 119, 193 (1921)). The yield of cellobiose octaacetate from the acetylosis of cellulose has been investigated by Ost (Z. angew. Chem. 19, 993 (1906); Ann. 398, 323 (1913). Ost Z. angew. Chem. 33, 100 (1920); Cellulosechemie 3, 25 (1922)) also claims to have isolated an isometric sugar which he calls isocellobiose but this has been criticized by Bertrand (Compt. rend. 176, 1583 (1923); 177, 85 (1923)) who claims that Ost's sugar is a mixture of cellobiose and a trisaccharide "procellose." The importance of the yield of cellobiose obtainable upon the structure of the cellulose molecule has been pointed out by Irvine and Hirst (J. Chem. Soc. 123, 525 (1923)) and by Karrer (Helv. Chim. Acta. 5, 187 (1922)). Recently a 90 per cent yield of cellobiose from wood pulp was claimed by Ozawa (J. Chem. Ind. Japan 27, 884 (1925)) but in an attempt to duplicate this high yield Friese and Hess (Ann. 456, 38 (1927)) could not obtain better than 50 per cent yield.

13. Production of levoglucosan by action of heat in vacero. Pictet and Sarasin (Helv. chim. Acta 1, 87, 226 (1918)) found that starch and cellulose gave appreciable (40 per cent) yields of levoglucosan when heated to 210° at 12-14 mm. This could be converted into dextrine by heating with platinum black (loc. cit. p. 226). Certain natural glucosides (Pictet and Gondet, Helv. chim. Acta 2, 698 (1919)) gave the same product. Karrer (Helv. chim. Acta 3, 258 (1920)) found that β-glucose also gave levoglucosan. Pictet et al (Helv. chim. Acta 3, 640, 645, 649 (1920)) showed that α-glucose gives glucosan and have suggested formulas for these anhydro-sugars and their bearing on the stereochemistry of α- and β-glucose. Their formulation has been accepted by Irvine and Oldham (J. Chem. Soc. 119, 1744 (1921)). The action of heat on cellulose has also been studied by Bain (Pulp and Paper Mag. Can. 24, 783 (1926)).

14. Destructive distillation of cellulose yields w-hydroxymethyl furfural. The presence of this substance among the products of the destructive distillation of cellulose was established by Erdman and Schaefer (Ber. 43, 2391, 2398 (1910)).

15. Action of Metallic salts on cellulose. The action of $CnCl_2$ has been discussed by Cross and Bevan (Cellulose, loc. cit. p. 8). Deming (J. Am. Chem. Soc. 33, 1515 (1911)) studied the action of various metallic salt solutions on cellulose and more recently the same subject has been investigated by Von Weimarn and his co-workers (Kolloid Z. 11, 41 (1912); 29, 198 (1921); Repts. Imp. Ind. Research Inst., Osaka, Japan, 4, No. 7 (1923)).

16. Hydrocellulose has been the subject of many investigations among which may be mentioned that of Heuser and Neuenstein (Cellulosechemie 3, 89 (1922)).

17. Action of acids on cellulose. The researches of Stern on the different action of HCl and H_2SO_4 have been reviewed by Cross and Bevan (Cellulose, loc. cit. p. 9). The action of HCl was studied by Willstaetter and Zechmeister (Ber. 46, 2401 (1913)). More recently Atsuki and Minaki (Cellulose Ind. Tokyo 1, 53 (1925); 2, 3 (1926)) have continued Stern's investigation and Lieser (Cellulosechemie 7, 85 (1926)) has shown that at 0° C. supersaturated HCl converts cellulose quantitatively into an alkali soluble product presumably without hydrolysis.

18. Relation of Cellulose to plant metabolism. Fischer (Ber. 23, 2238 (1890)) first proposed the formation of sugars from formaldehyde but this view was vigorously opposed by Michael (J. prak. chem. 60, 484 (1899)) because formaldehyde is poisonous to plants. Fenton (J. Chem. Soc. 67, 780 (1895); 71, 375 (1897); 75, 575 (1899)) showed that CO_2 can be easily reduced to formaldehyde. Cross and Bevan (Cellulose, loc. cit. p. 73) have discussed the possibility of starch as an intermediate product in the formation of cellulose. Michael's objection has recently been answered by the discovery of Klein and Wesner (Biochem. Z. 168, 361 (1926)) that formaldehyde actually exists in plants.

The brilliant researches of Baly and his co-workers (J. Chem. Soc. 119, 1025 (1921); 121, 1079 (1922) 123, 185 (1923); Ind. and Eng. Chem. 16, 1016, 1019 (1924); J. Soc. Dyers Colorists 38, 4 (1922)) have done much to establish the synthesis of hexoses from carbon dioxide through formaldehyde as an intermediate stage.

19. Cellobiose pre-exists in the cellulose molecule. Freudenberg (Ber. 54, 767 (1921)) maintains that the cellobiose linking pre-exists in the cellulose molecule and he is supported by the evidence of Karrer and Widmer (Helv. chim. Acta 4, 174 (1921); 5, 194 (1922)). On the other hand Hess and his co-workers (Ann. 435, 130 (1923); 443, 71 (1925); 450, 40 (1926)) maintain that the cellobiose linking is formed from glucose during the course of the acetylosis reaction. Recently Pringsheim (Ann. 448, 163 (1925) has accepted Hess's view since he finds a glucose anhydride-triacetate which condenses to cellosan among the hydrolytic products of cellulose acetate. From X-ray evidence Sponsler and Dore (loc. cit. Coll. Symp. Monograft) also believe this linking to be absent in cellulose.

20. The colloidal nature of cellulose is discussed by Esselen (Chem. Met. Eng. 23, 861 (1920)) andHerzog (Cellulose Symposium, 1926, Garden City Press, Gardenvale, p. 33).

Formulas for the Cellulose Molecule

Among those who have proposed formulas which are of little

importance in the light of more modern knowledge are Nastjukow (J. russ. Phys. Chem. Soc. 34, 231, 505 (1902)), Bernadou (Smokeless Powder, Nitrocellulose and the Theory of the Cellulose Molecule, 1908, Wiley and Sons, New York; see also Schwalbe, Chemie der Cellulose, p. 353), Mosenthal (J. Soc. Chem. Ind. 30, 782 (1911)), Gebhard (Chem. Zeit, 37, 662, 679 (1913)), Oddo (Gazz. chim. ital. 49, II, 127 (1919), and von Euler (Chem. Zeit. 45, 977, 998 (1921)). Now definitely disproved by our later knowledge of cellulose but of greater interest historically because of the eminent position of their authors are the formulas of Cross and Bevan (J. Chem. Soc. 79, 366 (1901); Cellulose, 1918 Ed. loc. cit. p. 75), Tollens (Kurzes Handbuch der Kohlenhydrate, 2nd Ed., 1914, J. A. Barth, Leipzig, p. 252, 564), Green (Z. Farben und Textil. Ind. 3, 97, 197, 309, 411 (1904); Rev. gen. Mat. Color 2, 130 (1907)) and Vignon (Bull. soc. chim. (3) 21, 599 (1899)).

Hibbert (Ind. and Eng. Chem. 13, 256 (1921)) was the first to correctly picture the glucose anhydride fragment from which cellulose is built and most later formulas have used this "baustein." Hibbert did not attempt to say either how many of these were united to form the cellulose molecule or how many molecules were polymerized to form the cellulose complex. Later attempts have utilized various numbers of these Hibbert units (of course, the 0-bridge must be changed to 1-5 if Haworth's work is accepted) to formulate cellulose. Hess (Kolloidchem. Beihefte 23, 93 (1926)) has abandoned his earlier conception of cellulose (Z. Electrochem. 26, 232 (1920)) as a penta-glucosidyl-glucose in favor of a simple anhydro-glucose i.e. one of the Hibbert units. Pringsheim (Z. angew. Chem. 39, 118 (1926); Ann. 451, 308 (1927)) seems to incline toward Hess' view although they are not in accord (Schultze and Hess, Ann. 450, 65 (1926)). Karrer (Helv. chim. Acta 4, 811 (1921); Cellulosechemie 2, 127; (1921)) and Herzog (Cellulosechemie 2, 101 (1921); Z. angew. Chem. 34, 385 (1921); Naturwissenschaften 8, 673 (1920)) have both indicated an anhydrocellobiose, i.e. two Hibbert units, as the unit of cellulose and think it polymerized only two or three times. Irvine and Hirst (J. Chem. Soc. 123, 521 (1923)) favor a triose unit because of the yield of cellobiose obtained from cellulose and Irvine and Robertson (J. Chem. Soc. (1926) 1488; see also Irvine, Chem. and Ind. 44, 242 (1925)) have isolated such a fragment from cellulose. Schorger (Ind. and Eng. Chem. 16, 1275 (1924)) has proposed a tetrose unit spatially arranged around a parallelopiped, each hexose residue being doubly united to two others and thus having no inner oxide ring. The most recent proposal is a tetrose unit by Gray (Ind. and Eng. Chem. 18, 811 (1926); Chem. Rev. 4, 355 (1927)) having three amylene and one butylene (h-glucose) inner oxide rings and based largely on the contention that one hydroxyl in each C_{24} unit has different properties from the other eleven.

Importance of Cellulose Industry

This subject has been discussed by prominent chemists recently (Herty, Ind. and Eng. Chem. 18, 1026 (1926); Esselen, Ibid. 18, 1031 (1926)) in a manner which shows that the idea of the growing importance of this field is spreading. The wide ramifications and interrelations of the industry are shown in maps (Ind. and Eng. Chem. 17, 33 (1925); Hibbert, Pulp and Paper Mag. Can. 24, 662 (1926)). Some statistics showing the growth of various branches of the cellulose industry are given in Chem. and Met. Eng. (32, 81 (1925)).

Sources of Cellulose and Complete Celluloses

A classification of fibrous materials for paper-making has been made by Clark (Paper, 23, 12 (1919)) while Thorp (Industrial Chemistry, 1913, MacMillan Co., New York, pp. 451-465) has given a classification of textile fibers. Schorger (Ind. & Eng. Chem. 9, 561 (1917)) and Dorr (Ibid. 12, 266 (1920)) have defined wood cellulose. Henderson (Ind. & Eng. Chem. 15, 822 (1923)) has discussed the properties of cotton linters while precto-cellulose has been dealt with in a paper by Webster (J. Chem. Soc. 43, 23 (1883)). Schulze (Ber. 24, 2277 (1891); Z. physiol. Chem. 14, 227 (1890); 16, 391 (1892)) has given a good definition of a hemi-cellulose. A standard cellulose for research purposes has been devised by a committee of the Cellulose Division of the American Chemical Society (Ind. & Eng. Chem. 15, 748 (1923)). Corey and Gray (Ind. & Eng. Chem. 16, 853, 1130 (1924)) have criticized and improved the method of preparation. Standard celluloses for various purposes are the subject of a recent paper by Schwalbe (Paper Trade J. 85, No. 12, 53 (1927)). Lenze, Pleus and Mueller (J. prak. Chem. 101, 213 (1920)) have studied gamma-cellulose. Other sources of cellulose are being used for pulp such as straw (News Edition 5, No. 2, 6 (1927)) and flax-straw (Bray, Peterson and Schafer, Ind. & Eng. Chem. 19, 371 (1927); Pulp and Paper Mag. Can. 25, 209 (1927); Paper Trade J. 84, No. 8, 207 (1927)).

The literature of lignin is very extensive. A great deal of work has been done by Klason whose earlier formula (Ber. 53, 706, 1862, 1864 (1920)) seems to conform better to the results of Melander (Svensk. Pappers Lid. 23, 461 (1921), 22, 440 (1921) cf. also Heuser et al. Ber. 56, 902 (1923); Cellulosechemie 5, 1 (1924)) than do his later formulæ (Ber. 55, 448, 455 (1922); 56, 300 (1923). Other work by Klason (Ber. 58, 375, 1761 (1925); Pulp and Paper Mag. Can. 24, 965 (1926); Paper Trade J. 81, 47 (1925)) has to do with special kinds of lignin. Hintikka (Cellulosechemie 2, 63 (1921)) has given a good criticism of Klason's work. Other types of formulation of lignin have been made by Schrauth (Z. angew. Chem. 36, 149 (1923)) and by Chambovet modified by Scott (Cellulose Symposium, 1926, Garden City Press, Gardenvale, p. 44).

Identity of Cellulose from Various Sources

Cellulose was first separated from woody tissue and classified as a carbohydrate by Payen (Compt. rend. 7, 1052, 1125 (1838); 8, 52, 169 (1839); 9, 149 (1839)). Fremy (Compt. rend. 48, 202, 275 (1859)) believed that the celluloses from different woods were different. This was denied by Payen (Compt. rend. 48, 210, 319 328, 358 (1859)) but later accepted in part. Many eminent investigators have not been sure that cellulose from different sources is the same. Thus Schwalbe (Chemie der Cellulose, loc. cit.) speaks of "celluloscarten"; Cross and Bevan (Cellulose, loc cit. p. 1) noted "many kinds of cellulose"; and Schorger (Trans. Wis. Acad. Sci. Arts and Letters 19, II, 734) mentions "distinctly different kinds of cellulose." Others, however, have apparently accepted the view point of Heuser (Textbook of Cellulose Chemistry, loc. cit. p. 194; Z. angew. Chem. 34, 461 (1921)) that, when sufficiently purified all cellulose is identical. Arguments for both views follow:

Arguments for Identity

1. It has been shown that cellulose from straw (Heuser and Haug, Z. angew. Chem. 31, 99, 173 (1918)) and from wood (Heuser and Boedeker, Z. angew. Chem. 34, 461 (1921)) may be hydrolyzed quantitatively to glucose, the rate of hydrolysis being nearly identical with that of cotton cellulose. (Heuser and Aiyar, Z. angew. Chem. 37, 27 (1924)).

2. α-cellulose from wood yields cellobiose octa-acetate in amounts similar to cotton cellulose (Wise and Russell, Ind. and Eng. Chem. 14, 285 (1922); 15, 815 (1923); cf. also Hintikka, Cellulosechemie 4, 62 (1923); Ozawa, J. Chem. Ind. Japan 27, 884 (1925)).

3. Wood cellulose shows an X-ray crystal structure identical with cotton cellulose (Herzog and Jancke, Ber. 53, 2162 (1920)).

4. Wood cellulose on nitration (Schwalbe, Z. angew. Chem. 27, 662 (1914)) and acetylation (Heuser et al, supra ref. 1, b and c) gives esters which are nearly identical and of similar yield to cotton.

5. Equal amounts of carefully purified wood and cotton cellulose give identical rotations in cuprammonium solution (Hess, Z angew. Chem. 37, 996 (1924)).

6. Irvine and Hirst (J. Chem. Soc. 125, 15 (1924) cf. also Hirst,

J. Soc. Chem. Ind. 41, 392 R (1922)) have shown that esparto cellulose is chemically identical with cotton cellulose.

7. The refractive indices of cellulose fibers from various sources is the same (Frey, Kolloidchem. Beihefte 23, 40 (1926)).

ARGUMENTS AGAINST IDENTITY

1. Although lichenin, a carbohydrate in Iceland moss, gives acetates similar to cellulose (Karrer, Joos and Staub, Biochem. Z. 136, 537 (1923); Helv. chim. Acta 6, 800 (1923)), methylates in a similar manner (Karrer and Nishida, Helv. chim. Acta 7, 363 (1924)) and when distilled rapidly in vacuo gives levoglucosan (Karrer and Staub, Helv. chim. Acta 7, 928 (1924)) like cellulose, it is soluble in alkali and *readily* hydrolyzes giving a 64-86 per cent yield of glucose (Salkowski, Z. physiol. Chem. 114, 31 (1921)). It is generally regarded as a hemi-cellulose (Karrer et al., Helv. chim. Acta 7, 144, 159, 518 (1924)).

2. Cellulose from Marine fibre (Posidonia australis) gives a triacetate having a very different optical rotation from cotton cellulose acetate (Earl, J. Chem. Soc. 125, 1322 (1924)).

3. It is very difficult to separate the pentosans from wood or straw cellulose (Heuser and Dammel, Cellulose chemie, 5, 45 (1924); Fromherz, Z. physiol. Chem. 50, 209 (1906); see also Heuser and Haug, supra.).

4. α-cellulose from coniferous woods always yields a small amount of mannose on hydrolysis (Sherrard and Blanco, J. Am. Chem. Soc. 45, 1010 (1923); Ind. and Eng. Chem. 15, 1166 (1923)).

5. Carefully purified cellulose from the angiosperms always contains furfural yielding substances (Schorger, Ind. and Eng. Chem. 9, 563 (1917); cf. also Wise and Russell, supra).

6. γ-cellulose is always absent in cotton cellulose and always present in wood cellulose (Mahood and Caple, Ind. and Eng. Chem. 14, 727 (1922)).

Analytical Methods for Cellulose

Hawley (Wood Distillation, loc. cit. p. 37) has given the results of his analyses of many species of wood and Mitscherling (Ind. and Eng. Chem. 15, 748 (1923)) has analyzed many species of cotton for the Cellulose Committee of the American Chemical Society. Hall (Cotton Cellulose, loc. cit. pp. 25, 41) also gives an analysis of cotton. Dore (Ind. and Eng. Chem. 11, 556 (1917); 12, 264, 472, 476, 984 (1920)) has studied various methods of analysis and worked out the best procedure for analyzing wood. The determination of cellulose has been criticized by Johnson and Hovey (J. Soc. Chem. Ind. 37, 132T (1918)).

The method of determining cellulose in fibrous materials was introduced by Cross and Bevan (Cellulose, loc. cit. p. 95) and modified by Renker (J. Soc. Chem. Ind. 28, 1269 (1909)). Sieber and Walter (Papier-Fabr. 11, 1179 (1913)) studied particularly the method of chlorination. Schorger (Ind. and Eng. Chem. 9, 556, 561 (1917)) and Johnson and Hovey (supra) have studied the determination of cellulose and suggested improvements. Dore (Supra p. 264, 472) and Johnson, Mahood and Dore (Ind. and Eng. Chem. 13, 358 (1921)) have worked out a very satisfactory procedure for determining cellulose in wood. Ritter and Fleck (Ind. and Eng. Chem. 16, 147, 947 (1924) have also contributed materially to this problem. An entirely different method has been proposed by Kiesel and Semigasnovski (Ber. 60, 333 (1927)).

Bray and Andrews (Ind. and Eng. Chem. 15, 377 (1923)) have found an improved method for determining α-cellulose. Schwalbe (Papierfabr. 23, 697 (1925)) has discussed the methods of determining α-cellulose while Parsons (Paper Trade J. 82, 211 (1926); Paper Ind. 1, 2019 (1926) has considered the significance of the test. Schwalbe's "copper number" has been investigated by Staud and Gray (Ind. and Eng. Chem. 17, 741 (1925); 19, 854 (1927)) who have discussed its value as an exponent of the quality of cellulose (Paper Trade J. 82, 150 (1926)). Dore (supra, p. 556) has outlined a method for the determination of lignin which is a modification of the work of Koenig, Chem. Zeit. 36, 1101 (1911); see also Koenig and Becker, Z. angew. Chem. 32, 155 (1919)). Schorger (Chem. of Cellulose and Wood, loc. cit. p. 505) has discussed analytical methods in general in a very comprehensive fashion.

Cellulose Nitrate

Braconnot (Pogg. Ann. 29, 176 (1833); Ann. chim. phys. 52, 290 (1833)) prepared the first nitrated carbohydrate by treating starch with nitric acid while Pelouze (Compt. rend. 7, 713 (1838); J. prak. Chem. 16, 168 (1838)) treated paper with nitric acid in a similar manner. Schoenbein (Pogg. Ann. 70, 320 (1847); Compt. rend. 23, 678 (1846)) is recognized as the real discoverer of cellulose nitrate although the discovery was made independently at the same time by Boettger and Otto (J. prak. Chem. 40, 193 (1847); Compt. rend. 23, 807 (1846)). Cellulose nitrate has been thoroughly discussed by Worden (Nitro-cellulose Industry, loc. cit. p. 21). The theory of the nitration has been the subject of investigation by Cross and Bevan (Ber. 34, 2496 (1901)) and by Hake and his co-workers (J. Soc. Chem. Ind. 24, 374, 914 (1905); 28, 457 (1909). An adsorption theory of nitration has been proposed by Zachias (Z. Farben und Textil Chem. 2, 233 (1903)) and considered by Justin-Mueller (Kolloid Z. 2, 49 (1907)) but Mueller (Kolloid Z. 2, 173 (1907)) has finally disproved it. Recently Herzog and Loudberg (Ber. 57, 329 (1924)) have declared that ordinary cellulose nitrate is not a homogeneous chemical individual.

Ordinarily cotton is used as a source of cellulose but such other sources as wood pulp (Schwalbe and Schrimpf, Z. angew. Chem. 27, 662 (1914); Lenze, Pleus and Mueller, J. prak. Chem. 101, 213 (1920); Woodbridge, Ind. & Eng. Chem. 12, 380 (1920)), corn cobs (Marsh, Ind. Eng. Chem. 13, 296 (1921)) and bamboo fibers (Nishida, Ind. & Eng. Chem. 8, 1096 (1916)) have been experimented with. Ullmann (Enzyk 5, (1917)) has given a good description of nitrating processes and a discussion of the solubility of the various nitrates. Recent advances in nitrating processes are discussed by Gabillon (Rev. gen. mat. plast. 81, 15 (1926)) while Stadelman (Chem. Met. Eng. 13, 361 (1915)) has considered the chemical engineering of nitrocellulose manufacture. Good descriptions of nitro-cellulose plants and their operation are given by Schlater (Chem. & Met. Eng. 25, 281 (1921)) and Du Pont (Chem. Met. Eng. 26, 11 (1922)). Recently Kranz and Blichter (Chem. News 134, 1, 17 (1927)), have proposed the use of phosphoric instead of sulfuric acid in nitration with mixed acid.

Pittman (J. Soc. Chem. Ind. 19, 983 (1900)) has discussed the construction and use of the Du Point nitrometer while Worden (Nitro-cellulose Ind. loc. cit. I, 65) has described the Lunge nitrometer. The analysis of nitro-cellulose solutions is the subject of a paper by Conley (Ind. Eng. Chem. 7, 882 (1915)). The denitration of cellulose nitrate has been investigated by Hadow (Jahresber. f. Chem. (1854) 626; J. prak. Chem. 64, 169 (1855); Haussermann (Chem. Zeit 29, 421 (1905)) and Piest (Z. angew. Chem. 23, 1009 (1910)).

Cellulose Acetate

The first preparation of cellulose acetate is credited to Paul Schutzenberger (Compt. rend. 61, 485 (1865); Chem. Zentr. (2) 10, 1036 1865)). Later on he improved his method of preparation (Compt. rend. 68, 814 (1869); Ann. Chim. Phys (4) 21, 235 (1870); Ann. 160, 740 (1871); Bull. soc. chim. 32, 338 (1879)). The use of catalysts was introduced by Franchimont who used sulfuric acid (Jahresber. Chem. (1879) 833; Compt. rend 89, 711,755 (1879) and zinc chloride (Compt. rend. 92, 1053 (1881); Ber 12, 1938, 2059 (1879)). Schwalbe (Z. angew. Chem. 21, 2401 (1908); 23, 433 (1910)) has discussed the necessity for using catalysts while Knoevenagel (Ann. 402, 111 (1914)) has shown the effect of different catalysts. Ost Chem. Zentr. 30, 11, 672 (1906)) has summarized the use of different methods of acetylosis and later showed the effect of using regenerated cellulose (Ost and Katayama, Z angew. Chem. 25, 1467 (1912)). Recently Zdanovich (Ind. & Eng. Chem. 12, 1173 (1920)) proposed the use of chloracetic acid as a catalyst in acetylosis.

TAPPI SECTION, PAGE 244

The earlist manufacturing processes have been reviewed by Ost (Z. angew. Chem. 19, 993 (1906); 24, 1304 (1911)). More recent reviews of the subject of cellulose acetate and its manufacture are given by Hall (Dyer and Calico Printer 56, 46 (1926)) and by Deschiens (Rev. gen. mat. plast 2, 291, 361, 411 (1926); Rev. prod. chim. 29, 5, 37, 73, 109, 151, 767 (1926)). Deschiens (Chem. and Met. Eng. 23, 533, 581 (1920)) has also written more in detail in regard to the manufacturing processes and uses of cellulose acetate. Solvents for cellulose esters with particular reference to the acetate have been discussed by Wilkie (Chem. & Met. Eng. 25, 1186 (1921)). The use of cellulose acetate in the manufacture of plastics is the subject of several papers by Eichengruen (Chem. and Met. Eng. 34, 468 (1927); Ind. Eng. Chem. 3, 437 (1911); Z. angew. Chem. 24, 366 (1911)). The use of cellulose acetate in aeroplane dopes has been reviewed by Britton (Ind. Chemist. 3, 59 (1911)) while Dinker (Ind. & Eng. Chem. 13, 831 (1921)) has written of the same subject with especial reference to European practice. Analytical methods in the cellulose acetate industry have been the subject of papers by Ost (Z angew. Chem. 20, 995 (1906)), by Green and Perkin (J. Chem. Soc. 89, 811 (1906)) and by Woodbridge (J. Am. Chem. Soc. 31, 1068 (1909)).

Viscose

The chemistry of soda cellulose and viscose have been referred to (supra) under "Reactions of Cellulose" (loc. cit.). Heuser (Textbook of Cellulose Chem. loc. cit p. 63) has given a formula for cellulose exanthate which, however differs considerably from the views of Ost, Westhoff and Gessner (Ann. 382, 349 (1911)) and of Bonwitt (Zeit, angew. Chem. 26, 89 (1913)). Cross and Bevan (Researches, 1900-1905, p. 93) have discussed the reaction in the formation of viscose. This subject was recently investigated by Berl and Bitter (Cellulose-chemie 7, 137 (1926)), who xanthated partly alkylated cellulose and concluded that for a complete reaction there must be two free hydroxyls in the molecule. Heuser and Schuster (Cellulosechemie 7, 17 (1926)) have recently studied the formula of viscose.

The ripening of viscose has proved a fascinating subject for study. Heuser (Textbook of cellulose chemistry, loc. cit. p. 68) has given one theory while Herzog (Kolloid Z. 35, 193 (1924)) from physical studies has arrived at a different mechanism. Two very interesting papers dealing with this subject are those by Leuchs (Chem. Zentr. 47, 801 (1923)) and by De Wyss (Ind. and Eng. Chem. 17, 1043 (1925)). d'Ans and Jager (Kunstseide 8, 17, 43, 57, 82, 110 (1926) have recently published a thorough study of this subject. The preparation of viscose in the laboratory has been the subject of papers by Snell (Ind. & Eng. Chem. 17, 197 (1925)) and by Morse (Ind. and Eng Chem. 18, 398 (1926)). The industrial possibilities of viscose were forecast by Cross and Bevan (J. Soc. Chem. Ind. 12, 498 (1893)) at the time of its discovery. Two special uses recently developed are cellophane (Piana, Chem. and Met. Eng. 30, 548 (1924)) and cellulose sausage casings (Henderson and Dietrich, Ind. & Eng. Chem. 18, 1190 (1926)).

Other Cellulose Esters

Cross and Bevan (Ber. 34, 2496 (1901)) have made mixed esters of acetic, benzoic, and nitric acids. Cross and Bevan (J. Chem. Soc. 63 838 (1893)) were also the first to prepare cellulose benzoate which was further investigated by Skraup (Monatshefte 10, 389 (1889)). Hauser and Muschner (Z. angew. Chem. 26, 137 (1913)) and Briggs (Z. angew. Chem. 26, 255 (1913)) prepared the benzoatee by a Schotten-Baumann reaction with alkali hydroxides. This method was tried by Ost and Klein (Z. angew. Chem. 26, 437 (1913)) who found pryidine a more satisfactory reagent. Recently cellulose benzoate has been the subject of an investigation by Atsuki and Shimoyama (Cell. Ind. Tokyo 2, 336 (1926)).

Worden (Tech. Cellulose Esters, loc. cit p. 2634) discusses cellulose propionate and this ester together with the formate form the subject of a paper by Woodbridge (J. Am. Chem. Soc. 31, 1067 (1909)). Cellulose formate has been prepared and studied by Berl and Smith (Ber. 40, 903 (1907)), by Bernberg (J. Soc. Chem. Ind. 26, 634 P (1907)) and by Cross and Bevan (J. Chem. Soc. 99, 1450 (1911)). Recently (Dutch patent. Chem. Abstr. 21, 1883 (1927)) the formate has been used to prepare a new rayon. Worden (Tech. Cellulose Esters, loc. cit. p. 2639). summarizes the known facts about cellulose butyrate which, together with the acetate and propionate esters, forms the subject of a paper by Stein (Z. angew. Chem. 26, 673 (1913)). Weber and Cross (Chem. Zeit, 29, 667 (1905)) have also prepared the butyrate. During the war, scarcity of acetic acid led Levey (Ind. and Eng. Chem. 12, 743 (1920)) to try to prepare cellulose phthalate. Recently esters of the higher fatty acids have been prepared by Gault and Ehrmann (Bull. soc. chim. 39, 873 (1926)). Kita and his co-workers (Cellulosechemie 7, 125 (1926); Kunstoffe 16, 41 (1926)) have studied the mechanism of the action of acid chlorides on alkali cellulose and have prepared cellulose palmitate and stearate.

Rayon

The growth of the rayon industry has been so rapid that its statistics have been the subject of many articles (Ind. and Eng. Chem. 17, 774 (1925); 18, 1044 (1926); Chem. and Met. Eng. 33, 345 (1926)). Woolf has tabulated the production of rayon (Textile World 71, 813 (1927)), and foreign importation (Ibid. 70, 1996 (1926)), the price history (Ibid. 71, 2557 (1927)) and the production by countries. (Ibid. 71, 3071 (1927)). These statistics are briefly reviewed by Charch (Annual Survey of American Chemistry, 1927, Chemical Catalogue Co., New York, 2, 352).

Reaumur, a French entomologist, first mentions the possibility of producing an "artificial" silk in his book (Histoire des Insects, 1, 154 (1734-42)). Recently a series of historical articles dealing with the pioneers of the rayon industry has appeared in the Silk Journal (3, no. 29, p. 59; no. 30, p. 57; no. 31, p. 60; no. 32, p. 57; no. 33, p. 62; no. 34, p. 55; no. 36, p. 53 (1926)).

Worden (Nitrocellulose Industry loc. cit. p. 454) and Matthews (Textile Fibres, 4th Ed., 1924, Wiley and Sons, Inc., New York, p. 672) have discussed rayon in a general way. Articles dealing with all the various rayon processes in general have been published by Mitscherling (Ind. and Eng. Chem. 15, 460 (1923)), Esselen (Am. Dyestuff Report 14, 713 (1925); 15, 166 (1926); Proc. Am. Ass. Text. Chem. and Colorists (1926) 98), Schlatter (Chem. & Met. Eng. 27, 533 (1922)) and Wilson (Ind. and Eng. Chem. 18, 829 (1926)). Charch (Cell. Symposium, 1926, Garden City Press, Gardenvale, p. 11) has described the production of cellulose nitrate rayon. Cellulose acetate rayon is the subject of a paper by Platt (Cell Symposium, loc cit. p. 15) while Mullen (Am Dyestuffs Rept. 15, 285 (1926) has compiled an index of articles dealing with this process. The recovery of solvents used in these processes is the subject of a paper by Weissenberger (Rayon J. 2, no. 4, 27 (1927)). The cuprammonium process has been described by Fryer (Chem. and Met. Eng. 30, 743 (1924)), Kirkpatrick, (Chem. and Met. Eng. 32, 845 (1925)); Luft, Ind. and (Z angew Chem. 31, 141 (1918)). The viscose process has been described several times (Snell, Chem. and Ind. 45, 925 (1926); Kirkpatrick, Chem. and Met. Eng. 32, 845 (1925); Luft, Ind. and Eng. Chem. 17, 1037 (1925); and Shoemaker, J. Chem. Ed. 4, 1260 (1927)). Recently Wurtz (Chem. App. 13, 25, 39, 126, 165, 185, 200, 225, 237, 248, 262, 271, 282; 14, 3, 14, 64, 75, 88, 100, 125) has described in great detail the layout of a viscose rayon plant. A series of articles dealing with new developments in rayon are those by Hall (Dyer and Calico Printer 58, 50 (1927)), by Hubener (Mon. sci. 16, 158, 249 (1926)) and by Sturtevant (Textile World 71, 319, 1741 (1927)).

The subcommittee on rayon of the American Society of Testing Materials has codified a series of tests of rayon (Rayon J. 1, 10 (1926)) which have been supplemented by Schreiber and Hamm (Textile World, 70, 65 (1926)) Mullin (Am. Dyestuff Rept. 16, 145 (1927) p. XII). The development of hollow threads of rayon is no. 38, 6 (1926)). The flammability of various rayons has been

studied by the Bureau of Standards (Chem. and Met. Eng. 32, 869 (1926)). Various faults of rayon are discussed in an article in the Silk Journal (4, no. 38, 53 (1927)). Pfund (Bull. Johns Hopkins Hospital 40, no. 4, 228 (1927)) found that cellophane possessed a remarkable transparency to ultraviolet light but apparently rayon does not have this property (Science, 66, Dec. 9 (1927) p. XII). The development of hollow threads of rayon is receiving attention abroad (Ind. and Eng. Chem. 17, 1249 (1925); Silk J. 2, no. 19 (1925)) as the production of a new fiber called "artificial wool" (News Edition 4, no. 20, 5 (1926); Drexler, Chem. and Met. Eng. 33, 345 (1926); Killefer, Ind. and Eng. Chem. 18, 1044 (1926)). Von Weimarn (Ind. and Eng. Chem. 19, 109 (1927)) has discussed the dispersion of nitrogeneous materials to produce an "artificial" real silk and the use of various inorganic salt solutions as dispersing agents is treated by Bary (Rev. gen. mat. plast., March, 1927, p. 131).

Lacquers and Enamels

The tremendous growth of this industry has been the subject of much statistical comment (Chem. and Met. Eng. 33, 3, 26, 45 (1926); 34, 58 (1927)). Crawford (Chem. and Met. Eng. 32, 505, 570, 635, 683 (1925)) has given us such an excellent bibliography on this subject that only a few paper need be mentioned. Toch (Chem. Age 32, 439 (1924)) has developed the subject of new and old lacquers; Ward (Paint, Oil and Chem. Rev. 79, no. 4, 10 (1925)) has written on lacquers alone, while Furness (J. Soc. Chem. Ind. 42, 1000 (1923)) treated both varnishes and lacquers and Weber (Ind. and Eng. Chem. 17, 11 (1925)) limited himself to insulating varnishes. Kirkpatrick (Chem. and Met. Eng. 31, 179 (1924)) described the production of Duco lacquers. The general subject of pyroxylin lacquers has been treated by Wiesil (Chem. Age 32, 439 (1924)), by Orr (Cellulose Symposium loc. cit. p. 46), by Frydlender (Rev. prod. chim. 29, 807 (1926)) and in an anonymous article (Chem. and Met. Eng. 32, 747 (1925)).

Willke (Chem. & Met. Eng. 25, 1186 (1921) has written of the question of lacquer solvents as has also Keyes (Ind. and Eng. Chem. 17, 558 (1925)). The subject of plasticizers has been reviewed by Brown (Ind. and Eng. Chem. 17, 568 1925)). All these subjects have been fully treated in the books by Wilson (loc. cit.) and Sproxton (loc. cit.).

Cellulose Plastics

The presentation of the Perkin medal to Hyatt for his invention of celluloid was the occasion for interesting historical reviews (Chem. and Met. Eng. 12, 131 (1914); Ind. and Eng. Chem. 6, 156 (1914)). Joyce and Worden (Ind. and Eng. Chem. 3, 193, 436, 702 (1911)) and later Schuepphaus and Chandler (Ind. and Eng. Chem. 6, 440, 601 (1914)) engaged in polemics over the question of who really invented celluloid. Du Pont (Chem. and Met. Eng. 26, 65 (1922)) has written of the manufacture of pyroxylin. Sproxton (J. Soc. Chem. Ind. 39, 352 R (1920)) has discussed the uses of celluloid. The possibility of using a substitute for camphor in the manufacture of celluloid has been considered by Sachs and Byron (Ind. and Eng. Chem. 13, 893 (1921)). The manufacture of extremely thin films of celluloid is noted (Ind and Eng. Chem. 16, 897, 1092 (1924)).

Explosives

Worden (Nitrocellulose Industry, loc. cit. p. 898) and Bernadou (Smokeless Powder etc. loc. cit.) have treated the use of nitrocellulose in explosives rather thoroughly. Davis (Ind. and Eng. Chem. 14, 1140 (1922)) has discussed the various colloiding agents used in powder manufacture. The use of nitro-starch as an explosive has been the subject of a paper by Sadtler (Chem. and Met. Eng. 16, 361 (1917)).

The process of treating cotton fabrics with caustic alkalies to produce lustre was discovered by John Mercer (Jahresber. f. Chem. 747 (1851); J. prak. Chem. 55, 40 (1852); Ding. polytech. J. 121, 438 (1851)). The subject is treated in general by Matthews (Textile Fibres, loc. cit. p. 578) and has been scientifically studied by Huebner and his co-workers (J. Soc. Chem. Ind. 22, 70 (1903); 23, 404 (1904); 28, 641 (1909).))

General articles on the manufacture of artificial leather by Given (Ind. and Eng. Chem. 18, 957 (1926)), by De Wilmet (Rev. gen. mat. plast. Nov. (1926) p. 691) and by anonymous author (Chem. and Met. Eng. 23, 487 (1920)) have appeared from time to time. The Caltex Company (Ind. and Eng. Chem. 17, 251 (1925)) offers a flowsheet showing the course of the product through the manufacturing process. The use of nitrocellulose in artificial leather manufacture has been discussed by Tucker (Ind. and Eng. Chem. 13, 623 (1921)). Kirkpatrick (Chem. and Met. Eng. 28, 1017 (1923)) have described the lay-out of the Duratex plant for the manufacture of coated fabrics.

Three New TAPPI Committees

In accordance with the policy of the Technical Association to promote the interest of its members in various technical activities two new committees are being organized. Any member wishing to participate in the interesting work of these committees should write to the secretary of TAPPI—18 East 41st Street, New York, or to the chairman.

A Committee on Physical Standard for Pulp of which H. A. Rothchild, of Kimberly Clark Company, Neenah, Wisconsin, is chairman has been formed to carry on the work started by the Sulphite Pulp Committee relative to the tests and physical property characteristic study of pulps.

The Committee on Coated and Processed Papers has been replaced by a new committee on Fine and Special Papers. The new committee will interest itself with the problems of the older committee and in addition cover such subjects as fine papers, permanence, photographic base papers, blue print paper, safety paper, etc. Dr. Th. C. Bentzen of Whiting-Plover Company, Stevens Point, Wisconsin, is the chairman of the new committee.

The Sulphite Pulp Committee under the leadership of R. N. Miller of the Champion Fibre Company, Canton, North Carolina, will once more turn its attention to manufacturing problems of great interest.

The growing interest by technical men of the industry in the subject of corrosion resistance is being met by the formation of a new committee on Corrosion and Waste Problems of which Dr. Dr. H. L. Joachim of Central Paper Company, Muskegon, Michigan, is chairman. In addition to the study of waste produced by corrosion, attention will be paid to other problems involving material losses to paper mills.

New York Leads in TAPPI Membership

An analysis of the membership of the Technical Association in the United States alone shows New York, Massachusetts and Wisconsin to be leaders. The Pacific Coast is however coming along fast and indicates that the new mills being opened in the west are being managed and operated by experienced men who are interested in the technical progress of the industry and are keeping abreast of the most recent technical and engineering advances. Following is the analysis by states exclusive of corporate members:

1	New York	170	16	Connecticut	10
2	Wisconsin	86	17	Delaware	8
3	Massachusetts	83	18	Virginia	7
4	Pennsylvania	58	19	West Virginia	6
5	Ohio	46	20	Tennessee	5
6	Michigan	45	21	California	4
7	Maine	33	22	Indiana	3
8	Illinois	30	23	North Carolina	3
9	New Jersey	25	24	Maryland	2
10	Minnesota	21	25	Mississippi	2
11	Washington	19	26	Vermont	2
12	Louisiana	12	27	Arkansas	1
13	Oregon	12	28	Iowa	1
14	Dist. of Columbia	11	29	Rhode Island	1
15	New Hampshire	11			

United States Patents on Paper Making

Issued During the First Quarter, 1928

Compiled by Clarence J. West, Chairman, Committee on Abstracts and Bibliography.

1,654,566. Carton closing machine. Charles H. Wild, assignor to Burt Machine Co., Inc., a Corporation of Maryland. (Cl. 93—2.) Jan. 3, 1928.

1,654,603. Process for the production of high alpha-cellulose fiber. George A. Richter, assignor to Brown Co., Berlin, N. H. (Cl. 92—13.) Jan. 3, 1928.

1,654,624. Process of separating vegetable fibrous material. Sidney D. Wells, Quincy, Ill. (Cl. 92—6.) Jan. 3, 1928.

1,654,656. Paper-crinkling machine. Wm. A. Lorenz, assignor to The Otaka Fabric Co., Hartford, Conn. (Cl. 92—69.) Jan. 3, 1928.

1,654,962. Paper-making machine. Austin E. Cofrin, Green Bay, Wis. (Cl. 92—49.) Jan. 3, 1928. (Felt and felt carrying rolls.)

1,655,242. Envelope. Sam Durant Rich, Columbus, O. (Cl. 229—80.) Jan. 3, 1928.

1,655,249. Stencil blank and process of manufacturing the same. Preston Roberts Smith, assignor to A. B. Dick Co., Chicago, Ill. (Cl. 41—38.6.) Jan. 3, 1928.

1,655,371. Method or process of cementing pulp stones. Herbert O. Keay, assignor to Laurentide Co., Ltd., Grand Mere, Quebec, Canada. (Cl. 51—278.) Jan. 3, 1928.

1,655,511. Drive for paper-making machines. Andrew N. Russell, Montreal, Quebec, Canada. (Cl. 43—48.) Jan. 10, 1928.

1,655,618. Apparatus for and process of explosion fibration of lignocellulose material. Wm. H. Mason, assignor to Mason Fibre Co., Laurel, Miss. (Cl. 92—1.) Jan. 10, 1928.

1,655,628. Barking drum. Carsten Royem, assignor to Herbert W. Guettler, Chicago, Ill. (Cl. 144—208.) Jan. 10, 1928.

1,655,714. Machine and method for making wall board. Kemper Slidell, assignor to C. F. Burgess Laboratories, Inc., Dover, Del. (Cl. 154—1.) Jan. 10, 1928.

1,655,718. Wall board. Howard F. Weiss and Ralph Forbush Norris, assignors to C. F. Burgess Laboratories, Inc., Dover, Del. (Cl. 154—2.) Jan. 10, 1928.

1,655,745. Coated paper. Logan G. Thomson, assignor to The Champion Coated Paper Co., Hamilton, O. (Cl. 91—68.) Jan. 10, 1928.

1,655,111. Device for regulating the tension of paper webs. Friedrich Fuchs, Zofingen, Switzerland. (Cl. 242—75.) Jan. 10, 1928.

16,848 (Reissue). Suction roll for paper-making machines. Earl E. Berry, assignor to Beloit Iron Works, Beloit, Wis. (Cl. 92—53.) Jan. 10, 1928.

1,656,368. Multiply paper bag. Adelmer M. Bates and John E. Cornell, assignors to Bates Valve Bag Corporation, Chicago, Ill. (Cl. 229—55.) Jan. 17, 1928.

1,656,645. Paper milk bottle. Arlington Moore, Worcester, Mass. (Cl. 229—5.6.) Jan. 17, 1928.

1,656,647. Foundation board. Joseph Bergenstein, Chicago, Ill. (Cl. 154—50.) Jan. 17, 1928.

1,656,765. Apparatus for bleaching purposes. Carl Busch Thorne, Hawkesbury, Ontario, Canada. (Cl. 8—2.) Jan. 17, 1928.

1,656,766. Paper-making machine. Charles W. Valentine, assignor to The Bagley and Sewall Co., Watertown, N. Y. (Cl. 92—44.) Jan. 17, 1928.

1,656,802. Drier for veneer, wall board and the like. Arthur J. Vance, assignor to The Cole Manufacturing Co., Painesville, O. (Cl. 34—12.) Jan. 17, 1928.

1,656,829. Process of treating bagasse-fibers preparatory to pulp board making. Herbert Theodore Price, Sydney, New South Wales, Australia. (Cl. 92—14.) Jan. 17, 1928.

1,656,842. Process of treating Spanish moss. Robert Stinson, Norristown, Pa. (Cl. 92—4.) Jan. 17, 1928.

1,656,853. Paper machine. Harry D. Bean, Montreal, West Quebec, Canada. (Cl. 92—48.) Jan. 17, 1928. (Drier section.)

1,656,876. Pulping engine. Walter Werner, assignor to The Noble and Wood Machine Co., Hoosick Falls, N. Y. (Cl. 92—22.) Jan. 17, 1928.

1,656,944. Safety gate for pulp vats. Donat Gervais, Stockholm, Me. (Cl. 39—88.) Jan. 24, 1928.

1,657,046. Apparatus for the production of fiber from flax and hemp straw and the leaves of Phorium tenax, sisal, abacca, yucca and the like. John Charles William Stanley, assignor to Oceania Industries Limited, Victoria, British Columbia, Canada. (Cl. 92—4.) Jan. 24, 1928.

1,657,048. Method of cooking sulphite pulp. George H. Tomlinson, Montreal, Quebec, Canada. (Cl. 92—7.) Jan. 24, 1928.

1,657,073. Apparatus for conditioning paper. Edward F. Dreger, Kentfield, Calif. (Cl. 34—40.) Jan. 24, 1928.

1,657,140. Bleaching with hypochlorites. Hermann Wenzl, assignor to the Firm: I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany. (Cl. 8—2.) Jan. 24, 1928.

1,657,193. Wall board. Paul Beshers, El Paso, Ill. (Cl. 154—45.9.) Jan. 24, 1928.

1,657,218. Pulping machine. Hermann Mallickh, Duren, Germany. (Cl. 92—24.) Jan. 24, 1928.

1,657,333. Plaster board. Carl Absmeier, Maywood, Ill. (Cl. 154—45.9.) Jan. 24, 1928.

1,657,509. Suction box for paper-making machines. Fred J. Latham, assignor to The Oxford Paper Co., a Corporation of Maine. (Cl. 92—51.) Jan. 31, 1928.

1,657,585. Construction material. Ray P. Perry, assignor to The Barrett Co., a Corporation of New Jersey. (Cl. 92—21.) Jan. 31, 1928.

1,658,213. Process for the production of cellulose by decomposition of vegetable fibers. Otto C. Strecker, Darmstadt, Germany. (Cl. 92—9.) Feb. 7, 1928.

1,658,216. Pulp digester. Adolph W. Waern, Ontonagon, Mich. (Cl. 92—7.) Feb. 7, 1928.

1,658,485. Paper-waxing machine. Ralph A. Hayward, Kalamazoo, Mich., assignor to Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich. (Cl. 34—48.) Feb. 7, 1928.

1,659,010. Felt-cleaning machine. Frederick W. Vickery, assignor to Vickery Limited, Boston, Mass. (Cl. 92—50.) Feb. 14, 1928.

1,659,072. Plaster board. Morgan K. Armstrong, Winnetka, Ill. (Cl. 154—45.9.) Feb. 14, 1928.

1,659,193. Process for making sodium monosulphite. Viggo Drewsen, assignor to West Virginia Pulp and Paper Co., New York, N. Y. (Cl. 23—129.) Feb. 14, 1928.

1,659,276. Device for holding rolls of paper. Edward E. Maston, assignor to Mid-West Box Co., Chicago, Ill. (Cl. 242—58.) Feb. 14, 1928.

1,659,282. Cloth board or similar article. George B. Scheffey, assignor to Lightship Board Co., Inc., Weehawken, N. J. (Cl. 206—50.) Feb. 14, 1928.

1,659,401. Process for recovering waste fibrous material. Lester Kirschbraun, Chicago, Ill. (Cl. 92—3.) Feb. 14, 1928.

1,659,718. Paper-box-making machine and the like. Samuel Bergstein, assignor to The Interstate Folding Box Co., Middletown, O. (Cl. 93—2.) Feb. 21, 1928.

1,659,809. Process for freeing cellulose fibers from vegetable materials. William I. Chidester, Portland, Ore. (Cl. 92—7.) Feb. 21, 1928.

1,659,877. Wall board. William M. Jenkins, Chicago, Ill. (Cl. 154—45.9.) Feb. 21, 1928.

1,659,953. Mechanism for working pulpous material. Helgo Wiggo Jespersen, assignor to Western Electric Co., Inc., New York, N. Y. (Cl. 92—54.) Feb. 21, 1928.

1,659,985. Container. Edward N. Stroesser, Milwaukee, Wis. (Cl. 206—58.) Feb. 21, 1928.

1,660,185. Means and method for making and sealing paper boxes and the like. Samuel Bergstein, assignor to The Interstate Folding Box Co., Middletown, O. (Cl. 93—6.) Feb. 21, 1928.

1,660,204. Rubber-impregnated paper and process of making the same. Kirke L. Moses, Brookline, Mass. (Cl. 91—68.) Feb. 21, 1928.

1,660,274. Stock deflector for blow boxes for paper-making machines. Andrew N. Russell, Lachine, Quebec, Canada. (Cl. 92—44.) Feb. 21, 1928.

1,660,411. Apparatus for making paper bottles. Andrew Bodor, assignor to Reinforced Paper Bottle Corporation, New York, N. Y. (Cl. 18—16.) Feb. 28, 1928.

1,660,538. Roll for paper-making machines and method of making same. Ralph H. Whitney, assignor to The B. F. Goodrich Co., New York, N. Y. (Cl. 92—44.) Feb. 28, 1928.

1,660,640. Paper-making machine. Eduard v. Asten, Eupen, Belgium. (Cl. 34—48.) Feb. 28, 1928. (Drier part.)

1,660,643. Paper-manufacturing machine. John W. Brassington, assignor to The Paper and Textile Machinery Co., Sandusky, O. (Cl. 92—38.) Feb. 28, 1928.

1,660,696. Process of producing cellulose and other chemical products. Hugo Wallin, Djursholm, Sweden. (Cl. 92—13.) Feb. 28, 1928. (Alkali silicate cooking liquor.)

1,660,901. Paper-conditioning apparatus. Jasper B. Willsea, Rochester, N. Y. (Cl. 34—20.) Feb. 28, 1928.

1,660,917. Rope-guiding bracket for paper-making machines. Russell Carpenter, Three Rivers, Quebec, Canada. (Cl. 34—48.) Feb. 28, 1928.

1,660,978. Machine for finishing paper. James Speed, assignor to Strathmore Paper Co., a Corporation of Massachusetts. (Cl. 101—23.) Feb. 28, 1928.

1,661,143. Paper bag. Zeno Littman, assignor to Cohoes Envelope Co., New York, N. Y. (Cl. 229—62.) Feb. 28, 1928.

1,661,326. Apparatus for forming and handling paper rolls. George W. Dingee, Utica, N. Y. (Cl. 242—266.) Mar. 6, 1928.

1,661,393. Paper corrugating and crinkling. Burnham C. Stickney, Elizabeth, N. J. (Cl. 154—30.) Mar. 6, 1928.

1,661,549. Paper-testing machine. Casper R. Taylor, assignor to Foreign Paper Mills, Inc., a Corporation of New York. (Cl. 73—51.) Mar. 6, 1928.

1,661,678. Apparatus for pulp-board making. Herbert Theodore Price, Burwood, Sydney, New South Wales, Australia. (Cl. 92—39.) Mar. 6, 1928.

1,661,727. Method and apparatus for making packing for fragile articles. Morris Koppelman and Simon Cooper, assignors to Moulded Pulp Devices, Inc., a Corporation of Maryland. (Cl. 92—42.) Mar. 6, 1928.

1,662,200. Paper making. Charles Neal Merrill, assignor to Great Northern Paper Co., Millinocket, Me. (Cl. 92—38.) Mar. 13, 1928. (Preserving the continuity of the paper sheet.)

1,662,226. Paper-making machine. George S. Witham, Jr., Hudson Falls, N. Y. (Cl. 92—46.) Mar. 13, 1928. (Head box and slice.)

1,662,277. Paper container. Arlington Moore, assignor to Clarke-Moore Corporation, Wilmington, Del. (Cl. 229—5.6.) Mar. 13, 1928.

1,662,299. Road binder. Michael F. Coughlin, Stoughton, Mass. (Cl. 134—1.) Mar. 13, 1928. (Sulphite liquor.)

1,662,466. Paper pulp and like beating engine. Samuel Milne, Edinburgh, Scotland. (Cl. 92—24.) Mar. 13, 1928.

1,662,491. Paper box. Alfred H. Crankshaw, assignor to Owens Manufacturing Co., Hoboken, N. J. (Cl. 229—6.) Mar. 13, 1928.

1,662,509. Safety paper. William R. Orndorff, assignor to The Todd Co., Inc., Rochester, N. Y. (Cl. 91—67.95.) Mar. 13, 1928.

1,662,605. Reinforced fibrous container and method of manufacture. Richard E. Hall, assignor to The Arvey Manufacturing Co., Wilmington, Del. (Cl. 229—3.5.) Mar. 13, 1928.

1,662,641. Process for sizing paper. Thomas Hans, assignor to Container Corporation of America, Chicago, Ill. (Cl. 92—40.) Mar. 13, 1928.

1,662,717. Method of rendering paper sheets locally transparent. Otto Poeppel, Eslingen-on-the-Neckar, Germany. (Cl. 91—70.) Mar. 13, 1928.

1,662,913. Envelope. Eugene F. Ahlquist, assignor to Gaw-O'Hara Envelope Co., Chicago, Ill. (Cl. 229—79.) Mar. 20, 1928.

1,662,929. Paper-making machine. Herman L. Kutter, assignor to The Black-Clawson Co., Hamilton, O. (Cl. 92—45.) Mar. 20, 1928.

1,662,951. Process of bleaching animal and vegetable materials. Alfred O. Bragg, assignor to International Bleaching Corporation, a Corporation of Delaware. (Cl. 8—2.) Mar. 20, 1928.

1,663,095. Building material. Ray P. Perry, assignor to The Barrett Company, a Corporation of New Jersey (Cl. 92—21.) March 20, 1928.

1,663,503. Process of making structural insulating boards of exploded ligno-cellulose fiber. William H. Mason, assignor to Mason Fibre Company, Laurel, Miss. (Cl. 92—1.) Mar. 20, 1928.

1,663,504. Press-dried structural insulating board and process of making same. William H. Mason, assignor to Mason Fibre Company, Laurel, Miss. (Cl. 92—3.) Mar. 20, 1928.

1,663,505. Hard grainless fiber products and process of making same. William H. Mason, assignor to Mason Fibre Company, Laurel, Miss. (Cl. 92—54.) Mar. 20, 1928.

1,663,506. Integral insulating board with hard welded surfaces. William H. Mason, assignor to Mason Fibre Company, Laurel, Miss. (Cl. 92—38.) Mar. 20, 1928.

1,663,542. Process of making containers. Robert G. Clyne, St. Louis, Mo. (Cl. 93—36.) Mar. 27, 1928.

1,663,554. Paper-roll wrapping machine. Günther Meyer-Jagenberg, Dusseldorf, Germany. (Cl. 93—2.) Mar. 27, 1928.

1,663,699. Splint catcher. Arthur Hansen and Leif Gaarder, Skotselven, Norway. (Cl. 92—29.) Mar. 27, 1928.

1,663,794. Rosser. Charles Ernest Clowes, Fredericton, New Brunswick, Canada. (Cl. 144—208.) Mar. 27, 1928.

1,663,976. Method of sizing paper. Judson A. De Cew, New York, N. Y. (Cl. 92—21.) Mar. 27, 1928.

1,664,033. Stencil sheet. Shinjiro Horii, Tokyo, Japan. (Cl. 41—38.6.) Mar. 27, 1928.

1,664,229. Drier-control system. Stephen A. Staege, assignor to Westinghouse Electric and Manufacturing Co., a Corporation of Pennsylvania. (Cl. 219—20.) Mar. 27, 1928.

1,664,319. Process for the manufacture of a cellulose product having the appearance of wool. Augustin Pellerin, Troutville, France. (Cl. 18—54.) Mar. 27, 1928.

Section of the

COST ASSOCIATION OF THE PAPER INDUSTRY

Affiliated with

THE AMERICAN PAPER AND PULP ASSOCIATION

Conducted by THOS. J. BURKE, C.A., Sec-Treas

Cost Reduction By Waste Utilization

Thursday Morning Session of the Cost Association of the Paper Industry February 23, 1928

The meeting convened at 10:15 A. M., President Knott presiding.

PRESIDENT KNOTT: Mr. Burke has already informally introduced Mr. Baker, Engineer of the American Paper & Pulp Association. So it will not be necessary for me to do that now, in formally calling the meeting to order and getting our program for the morning under way. Mr. Baker gave a paper before the meeting of the American Paper and Pulp Association the other day, which was very much enjoyed, and I know we will enjoy his talk today.

C. M. BAKER: I heard a speaker once say that he thought of one talk, prepared another, delivered a third, and saw a fourth in the newspapers the next morning. Now I have really made very little preparation but planned on talking to you briefly upon returns from a questionnaire sent out to the industry in December, 1927, with a follow up letter on February 6, 1928. The informal discussion before the chairman called the meeting to order, however, indicates your interest in another line, but I will follow my original plan and first give you a brief summary of the data thus far collected.

This information is by no means complete, but from about two hundred replies received, thirteen present the data in such form that the returns to the mills from improvements made can be conveniently converted into dollars and cents.

MR. BURKE: What questionnaire was that?

MR. BAKER: It was a questionnaire sent out on December 3rd, and a follow-up letter was sent out on February 6th.

MR. BURKE: Asking for information about white water losses?

MR. BAKER: There were four questions. The first requested information regarding expenditures made in waste utilization and stream improvement, prior to 1926, also during 1926 and 1927. The second question was in regard to research that had been completed, was in progress or contemplated; the third, regarding white water losses and returns from recovery processes, and the fourth, as to whether similar data had been furnished to any other groups or organizations.

There is a feeling on the part of the public that industry is doing little or nothing to prevent stream pollution. That feeling prevailed in Wisconsin when I was with the State Board of Health there. However, a survey of the paper mills alone indicated that during two years' time there they had spent about $600,000 in waste utilization and stream improvement. That information was given to the press, distributed to the public, and resulted in quite a different attitude that permitted the development of a constructive cooperative program. We are trying to keep the Izaac Walton League and other organizations informed as to what is being done. It is probable that the paper industry is spending upwards of one million dollars annually in waste utilization and stream improvement, but data are not available to substantiate this. Question No. 1, therefore, was for the purpose of securing such data. Such material is of inestimable value in indicating to the public what is being done. You can talk to the public more intelligently in dollars and cents than you can in save-alls.

Data requested in the second question with reference to research is necessary to co-ordinate such activities in the various mills, prevent duplication, and keep the work going on in a constructive way.

The third question was asked simply to gather information regarding returns from white water recoveries, and the fourth, that we might develop a procedure in sending out questionnaires that would prevent duplication.

Some seven hundred questionnaires were sent out. About 185 replies have been tabulated, thus indicating a return of about 24 per cent. The returns in the various states have varied from zero in some of the states where there are few mills, to 54 per cent. There are quite a number of states where the returns were above 40 per cent.

MR. BURKE: That is a fairly good return—24 per cent. It is not big enough for your purpose, though.

MR. BAKER: I know, but replies are still coming in, and after the convention more will doubtless be received. There is a feeling among many that questionnaires are an abomination, because so many of them are being sent out by various organizations that they are becoming considerable of a burden. In our work on waste utilization and stream improvement very few questionnaires will be used, but it is the only method with which we can gather certain information at present. Later, as committees are developed in the different states, efforts will be made to gather such information through local committees rather than directly through the activities of the Association.

The total expenditures of the 185 mills tabulated were, prior to 1926, $1,202,250; during 1926, $587,180; during 1927, $692,557; or a grand total of $2,481,987. These figures will not correspond with those given the other day in the American Paper and Pulp Association's meeting, because other questionnaires received have been added since then.

As previously stated, only 13 of the mills presented data from which returns in dollars and cents could be readily computed. However, some of the other data may be converted to such terms

when the tonnage of the mills and certain other information is checked. The results from these thirteen mills is given in the following tabulation:

RETURNS FROM INVESTMENTS IN WASTE UTILIZATION OF 13 MILLS, BASED UPON QUESTIONNAIRES OF DECEMBER, 1927

Mill No.	Total expenditures	Annual return	Per cent Annual return
1	$70,000	$7,000	10
2	20,000	3,430	17
3	5,000	912	18
4	13,700	2,737	20
5	25,400	20,000	79
6	54,000	51,100	95
7	68,500	75,000	109
8	14,000	25,550	182
9	14,000	32,600	232
10	9,000	21,925	244
11	11,000	29,000	264
12	41,000	130,000	320
13	25,400	109,500	430
	$371,000	$508,754	137

Returns from the 13 mills listed above therefore equals 22 per cent on total expenditure of $2,481,987 made by 185 mills from whom returns have been received.

MR. BURKE: May I make a suggestion there? It would be interesting if you could say what grade of mills those are.

MR. BAKER: Time has not yet been available for that since many of the replies were only recently received. The data presented is only preliminary. It will be observed that the annual returns on the investment ranged from 10 per cent to 430 per cent, only three mills indicating less than 20 per cent return and the average for all being 137 per cent. Furthermore, this $508,754 return from the thirteen mills amounts to 22 per cent upon the total expenditures made by the 185 mills tabulated. The total return is really much greater because practically all the mills indicate substantial returns but not in such form that it could readily be computed in dollars and cents. For instance, reduction in fiber losses of two, three, five or six pounds per thousand gallons was reported in many instances, but no data given regarding the total volume of waste. In other cases per cent recovery of original losses were presented without indicating what the original losses were.

It is realized thoroughly that this information is not particularly significant until interpreted in the different mills classifications, which will be done later. The remarkable returns, however, furnish food for thought.

MR. BURKE: If you apply the average of over 100 per cent, which is the return the thirteen mills obtained according to the final figures, to the total expenditures of $2,000,000, you get a return of over $2,000,000 profit for the 185 mills.

MR. BAKER: The point is this, gentlemen: The principal reason for existence of the Cost Association is your ability to furnish information that will result in savings or an increased financial return to the industry. You are not simply bookkeepers to juggle a lot of figures so that they balance. Your studies, and your cost data, are developed and presented in a way that indicates to the executives where savings may be made. There is a certain amount of shrinkage or loss in every mill. It is of interest to know where this shrinkage or loss is going. What is it? Is it a loss of material that can be recovered to financial advantage? This data presented indicates that such has been the case in many mills and if there have been such losses, there still is a lot of waste going into the streams that is of definite economic advantage to the mills. Much of this waste can be recovered and utilized to the financial advantage of the mills. If you of the Cost Association can develop with your engineers and other technical personnel a method of accounting or accumulation of data that will indicate these losses, and if you then can interpret the data in dollars and cents to your executives, you will help a lot in stimulating a definite study of this problem in your mills that will undoubtedly mean a substantial financial return to many, if not to all.

The question of units in which to report data is very important. One mill will report its shrinkage without accurate knowledge as to where the losses represented in this shrinkage are going. Another mill will report their losses of fiber and clay, in so many pounds per thousand gallons of waste, but have no data regarding the volume of wastes, which obviously means nothing on considering total loss. Such data should be secured as will permit computing the losses in some definite terms as pounds or per cent of raw material or per unit of finished product.

MR. BURKE: What is the chief information they should get? First of all, the amount per thousand gallons passing out of the mill, and then the test of the solids in that?

MR. BAKER: A practical way to secure this data apparently consists in careful measurements of the volume of flow and the collection and analyses of composite samples to determine the material in them. The amount of fiber or clay per thousand gallons may thus be determined, also the total daily losses, which in turn may be converted to pounds per ton, of product. In so doing, however, care should be taken that both units are on the same basis, particularly with reference to moisture content.

MR. BURKE: Why wouldn't it be better to express it as per ton of raw material used?

MR. BAKER: That could be done as far as I know.

MEMBER: How could you do it? A good many mills using slush pulp would have trouble in finding out how much they could use.

MR. BURKE: If you can find out the amount of fiber and clay you are losing in slush form, or estimate it in slush form, then surely you can estimate in a similar way the amount of fiber you are using in slush form, the same way as you can in estimating the flow that is going out. Have calibrated tanks by your beaters and samples taken as to the density, which must be fairly well regulated to make decent paper.

MEMBER: It is all right on certain kinds of paper. Lots of mills just run in a certain amount of slush pulp and do not know the density.

MR. BAKER: The expression of results in terms of the raw product would include the "broke" if the "broke" returned to the beaters is weighed in as a part of the raw product. However, your broke is a complete cycle within itself. If you start out with so much broke and wind up at the end of the day or week with an equal amount, there has been no loss of the original raw material from this source. That is, your broke is not an actual loss of material but rather a loss in time and labor. Therefore, I believe an expression in terms of finished product would be logical. All figures, however, must be based upon a certain moisture content.

The Advisory Committee on Waste Disposal of Wisconsin Pulp and Paper Industry discussed this question, and unanimously decided in favor of an expression of losses in pounds per ton of finished product.

MR. BURKE: Wouldn't it be better to express it as bone dry in that case, so that you can correct for the moisture content in the paper? Because the moisture contents in the papers vary to some extent.

PRESIDENT KNOTT: You had better stick to air dry. We have discussed that before and decided that air dry is better, for cost figures.

MEMBER: The standard will be the same if they are brought to the same basis.

MR. BAKER: The chemist will report his results in bone dry. One mill engineer reported that they reduced everything to a ten per cent moisture basis. Raw material is purchased on that basis. If it has twenty per cent moisture, a corresponding reduction is made. If it has only four per cent moisture more is paid for it. If all results are given in percentage it makes no difference on what moisture content the results were computed, but the recovered material and finished products must first be reduced to the same moisture content in order to compute a correct percentage.

The straw board mills have, in the past, had a very serious problem in regard to stream pollution. About a year or eighteen months ago, however, they initiated cooperative research, employing a consulting chemist to direct the work. The results have been most gratifying, since a process has been developed whereby a satisfactory sheet is produced with little or no washing of the straw. This has resulted in considerable saving of material and power and, therefore, a substantial reduction in cost of production. Furthermore, objectionable stream pollution prevented.

Gentlemen, this has been a rambling talk, but I have given you the data I have at hand. If there are other questions I will be glad to answer them if I can do so.

MR. BURKE: I think that you have dealt with the subject from an accounting viewpoint, as we want you to deal with it, and I know when this talk is published it will have the effect of drawing the attention of many accountants to the work you are doing; and I hope it will have the effect of bringing in a number more returns to you. I personally agree with you that it is one of the two things in which perhaps larger savings can be effected than anywhere else. I attempted something along those lines a year or so ago, but could not get very far with it. I got only thirty or forty replies in, and many gave data that could not be really used in a report. So I do feel that it is a matter of very great interest and should be of great interest to all the accountants.

If you gentlemen here have any questions I wish you would bring them up now so that Mr. Baker will have the benefit of your viewpoint on the subject.

How many mills here have no save-alls at all? (No hands were raised.)

How many have a closed system? (No hands.)

MR. BAKER: There are a number of mills operating on substantially a closed system. One difficulty they have had is with slime but this can be controlled, I believe, by chlorination.

MR. BURKE: Do you know of any high-grade writing mills that have it? They claim they cannot use much of the stuff on account of the slime.

MR. BAKER: They are recirculating to some extent. One mill in New England is recirculating part of the white water during the winter but not in summer because of trouble with slime. It is probable, however, that the slime could be controlled by chlorination. In talking with one mill engineer in the fine writing paper industry, he expressed the opinion that they would ultimately return a large part of the recovered material into the product.

MR. BURKE: Another suggestion made to me in connection with that when I raised the point, with engineers, that it could not be used in fine mills, was—why could not they use it and make cheaper product of some kind, rather than waste it and pollute the streams?

MR. BAKER: I think that is possible. For instance, two mills in one locality were collecting their recovered material in barrels and selling it for twenty-five cents per barrel to what they call the "mud mill," manufacturing a roofing paper. It developed that the barrels were costing twenty-five cents and they were making nothing, so the practice was discontinued. It may be feasible, however, to concentrate this material by reducing the moisture and thus make its sale economical and practical.

MEMBER: Aside from the recovery of waste there are a lot of advantages in a closed system. For instance, there is the item of the heat units, and one thing that does not normally appear is the use of alum. A lot of alum is wasted when you throw away great quantities of water, and the cost of water itself and the expense of pumping it. That is aside from the materials that are saved.

MR. BAKER: The question of water in a number of mills is becoming a vital issue, not only in quantity where the supply is limited but the cost where the water is purchased or where expensive treatment processes are necessary to secure a satisfactory supply. The latter is particularly true in mills where their source of water supply is often streams polluted from the wastes of other mills or industries above. If the water can be reused a less quantity will be necessary. One mill has effected a saving of about $600 a month in its water bill by the installation of rather inexpensive settling tanks and recirculation of the water.

MEMBER: It would be well to check up on the number of gallons used per ton of product. Some mills use a lot of water and some mills get along with relatively small amounts.

MR. BURKE: It is a thing I cannot understand. I have been into that and some of them talk forty and fifty thousand gallons a ton. And I have heard MacNaughton swear that the Tidewater Company used only twenty-five hundred gallons a ton.

MEMBER: There is a difference in our two mills. Our Dayton Mill uses about ten times as much water as our Oxford Mill does.

MR. BURKE: It would be a good idea to check up on that and see what figures we could develop on it.

PRESIDENT KNOTT: Thank you very much, Mr. Baker. We appreciate your coming here. And we are very much obliged to you.

Paper for the Post Office Department

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 25, 1928.—Announcement has been made by the Post Office Department that it will receive bids on May 22 for bond, book, mimeograph, manifold, manila, news print and kraft wrapping paper and plain facing slips, cardboard and tags for the postal service for the fiscal year beginning July 1. Among the amounts asked for are the following:

1,375,000 sheets white sulphite bond paper.
86,500 pounds white sulphite bond paper.
2,280 pounds various colors sulphite bond paper.
222,400 pounds white book paper.
92,000 pounds white impression paper.
25,500 pounds white typewriter paper.
1,200 rolls adding machine paper.
480,000 pounds wood manila label paper.
14,000 pounds same in rolls.
46,000 pounds same in rolls.
13,000 pounds flat standard news print paper.
76,000 pounds same flat.
747,000 pounds same flat.
13,000 pounds same in rolls.
22,000 pounds same in rolls.
54,000 pounds flat wrapping paper.
68,000 pounds same flat.
65,000 pounds same flat.
12,200 pounds colored cardboards.
21,000 pounds white cardboard.
14,600 pounds white railroad board.
4,500 pounds colored cardboard.
32,000 pounds manila cardboard.
480,000,000 plain facing slips (16 cars).
6,000,000 customs declaration tags.
700,000 dispatch note tags.
13,000,000 tags.
10,000,000 tags.
37,000,000 tags.
20,000 tags.
3,000,000 tags.

Schroon River Paper Mill Workers Fight Fire

[FROM OUR REGULAR CORRESPONDENT]

WARRENSBURG, N. Y., April 30, 1928.—Employees of the Schroon River Pulp and Paper Company were drafted last week to help fight a forest fire which broke out in a large tract of timberland along the Hudson River and assumed threatening proportions. The district fire warden and staff were on the scene early but when the blaze spread beyond control a call was sent to the paper mill and thirty employees of the mill were rushed to the scene of the blaze which required several hours of diligent efforts on the part of the fire fighters before it was brought under control. The paper mill property was not threatened.

Plant Control By Means Of Cost Records*

By Arthur H. Kaeppel[1]

Many if not most manufacturing establishments maintain cost departments, and in the majority of these the value of costs is well understood. In some of these the data obtained, from the cost records are utilized to their full value. Unfortunately, there are still far too many establishments in which little use is made of costs and there are even cases where costs are not obtained.

These latter usually go out of business; but before they do so, they furnish a pernicious kind of competition which is not only costly to the well managed establishment, but whose detrimental influence is so far-reaching as to affect materially both the employer and employee, or, if you will, both capital and labor. This is particularly true during times when trend specialists arouse a feeling of uncertainty concerning future business activities, which oftentimes create a wholly unnecessary panicky reaction.

In the past few years we have heard much about the theory of cycles, but even should we feel disinclined to deny the theory, we cannot escape the conviction that it has been greatly overstressed, and offers little or no reliance to a particular industry. This has been the experience of the field in which I am active. Scientific data supplied by expert cost men, on the other hand, discovers causes, whereupon it is but a short step toward the application of correct and of remedial measures when necessary both for present and for future planning.

Broadening Specialization

We have also heard much talk of late about specialists, and I believe all of us should specialize in some particular field of work. As a matter of fact, our work must follow special lines if we hope to become productive workers. Special knowledge, special training is required to do special work successfully. But the very work we do as specialists will endure only under the seasonal and human exigencies of its working environment. Therefore, I firmly believe that we have already passed from the specialists' era to one requiring less limited and a much broader understanding of practical affairs of science and of human relations. Consequently the executive, in whatever capacity he may function, must not only learn all he can of his particular field, but also as much as possible of related and unrelated fields.

Frankness and open-mindedness in the exchange of ideas and experience among business men generally, and manufacturers more particularly, will greatly assist in the advancement of uniform or standard costs in similar industries. Surely we may take our proof from history for the development of unification in all matters with the adoption of a like language. Therefore, from a potpourri of cost languages, you have an exceptional opportunity to develop a similar cost language for every similar plant.

The cost man above all must not limit himself to cost finding only, but must be a scientist in the broader sense as well.

Management Must Be Liberal

The point I wish to make is that management must be liberal in its attitude toward cost advancement, and must grant the efficient cost man the latitude which he requires, not only to develop a good cost system but to develop himself also with the times. If management once understands the significance of costs, then cost records will soon become the media which will direct the way for greater efficiency in the conduct of business generally. When management reaches so high a plane of constructive thinking that it will regard its cost system as the best and most usable tool at its disposal for the successful shaping of policies, then indeed will cost men find a stimulus for renewed energy in the development of further aids to management control. Therefore, I want to say at the outset that management cannot exist in this day and age without accurate costs.

I hope that business men who know costs will not permit themselves to be stumped by the so-called wiseacre who does not know costs. I wish we could corral all the business people who have not yet done their cost work, for the purpose of teaching them their costs; or, should they refuse to be taught, so that we could properly punish them before we all assimilate too much punishment.

Cost records unquestionably furnish the means for intelligent direction. The balance sheet provides a graphic picture of conditions and influences policies, but costs supply the data which make intelligent control possible. Management cannot detect slight but oftentimes costly variations in operating efficiency without statistics.

Conception of plant conditions based solely on observation is at best unreliable and oftentimes misleading, except perhaps in the quite small plant. But even the small operator is better equipped to cope with the usual management problems if he bases his judgment on cost data which are correctly compiled.

Must Have Available Accurate Data

Practically everything we humans do in this day and age is a process of scientific application. It becomes, therefore, a matter of first importance, to have available accurate data, which make possible scientific analysis, which in turn indicates correct procedure. Cost records are often incomplete; they do not supply needed data; they frequently obscure the real objects sought by their complication and confusion of unnecessary detail. Such cost records fail to inspire confidence, they irritate and annoy, they are useless.

It is pretty generally recognized among manufacturers that cost systems serve some useful purposes; and the reluctance or slowness with which cost finding methods are sometimes adopted by management is by no means due to the expense of maintaining a cost department, but to the rather prevalent feeling that the final result is not always an intelligible analysis of actual plant conditions and only too often presents a mass of statistics which no executive has either the time or inclination to study.

Cost systems seem often to have a most peculiar propensity for the accumulation of detail without achieving the result which the busy executive really wants, namely, price, and plant control in so concise a form that only a little study will suffice to visualize the barometric tendencies of market and production. It is absolutely essential to the successful marketing of any commodity that the price is right with respect to supply and demand and actual cost. It is perhaps more, and surely equally important, that production cost be at all times right. Right, in the latter instance, does not merely mean the cost ascertained by cost records which balance with accounting records.

From the auditor's point of view, such a test establishes the correctness of the cost records, but from the manufacturer's standpoint production cost is right only to the extent in which it conforms to or varies from the normal cost established by the industry as a whole. In other words, if the operating expense in a certain plant is greater than that of a competitor's, it is imperative to the successful conduct of the business that such excess be discovered and eliminated.

In Constant Touch With Results

The important question to which the cost system must discover the answer is, "Who is right?" If one establishment is losing

---

* Address delivered before Illinois Manufacturers Cost Association of Chicago. From Manufacturers News.

[1] Secretary and Comptroller, Northwestern Terra Cotta Company, Chicago, Ill.

orders or finds its bids high, and another is operating on a profitable basis, it is apparent that management must discover the cause and find means for cost reduction or for other expedient measures to correct the situation.

Always must management go back to cost records. It is therefore, essential that these tell the story, point the way and supply the means for control. The fact that the cost is correct, however, is by no means a safe criterion for the correctness of plant operations. Whether the plant is large or small, it is vitally important for management to keep in constant intimate touch with results.

Management which attempts this by keeping in physical touch only with the functioning of the various activities in a plant is foredoomed to failures. A successful management has time only for the weighing of results and in order to fix responsibility for efficiency or failure intelligently, correctly, and justly, facts and figures must be provided which will clearly show them.

We use our cost records for practically every phase of plant control.

Our cost department is not large and expensive, but, under the able direction of our cost accountant, is quite efficient and we believe rather purposeful. Unlike many others, ours is not a separate department but combines with cost finding or recording the general accounting. We believe this combining of these two statistical divisions offers advantages which cannot be overlooked in an establishment such as ours.

Very few expenditures are made directly through the accounting records, which naturally places expense control where it belongs, namely in the cost department. Our cost man, who also functions as our accountant, has the advantage of both the cost picture of the expenditure and the balance sheet picture of it.

All of our statistics are recorded with the certain definite purpose of fitting into or forming part of a final picture for management use. Now, then, management should have a rather clear conception of what is needed to direct the various activities scientifically.

What Is Needed

We want the following:

First—Analyses of existing conditions.

Second—Determination of standards for budgetary control.

Third—Comparative analysis to determine trend.

Analyses of existing conditions is placed at the head of requirements, because we feel that we must know actual conditions before any conclusions whatever can be drawn from costs for any purpose.

Naturally, we are tremendously interested in the balance sheet structure and carefully study the usual ratios presented in this form. Perhaps we may find these ratios quite satisfactory; they may indicate satisfactory progress. But the picture presented is specific only in a general way, and we have learned that only a very broad policy control is possible from the balance sheet set up.

We must find the means for specific plant control and this of late has almost become a matter of life and death in most industries. For this purpose our cost department prepares a cost summary, which includes every item of expense.

Divisions and Sub-divisions

This summary contains the following divisions and sub-divisions:

Prime cost, plant overhead, total plant cost, selling cost, general administrative cost.

This is sub-divided as follows:

Operating or productive departments, material preparing departments, service departments.

The unit of measure for our product is the actual weight of the material, and we express or define this as a ton of terra cotta. Now the cost summary report furnishes us with a unit or per ton cost of the various divisions shown, as, for example, prime cost per ton in each department, etc.

It is therefore readily seen that we obtain from our cost system a current statement of actual cost conditions throughout the establishment. This statement is a summarization of every item of operating expense, and the cost department is in a position to furnish a detailed analysis of every division or group shown on the cost summary. This enables management to detect any variation from standard cost.

As is the case in most establishments which maintain efficient cost departments, standards used for budgeting purposes have been developed over a series of years in our cost department.

Northwestern Progress Club

We have an organization in our establishment of which we are extremely proud, the Northwestern Progress Club. Its membership consists of plant executives, foremen and assistants. I do not now wish to say much about the functioning of this club, except perhaps that it has been highly successful and for the purpose of this subject I may say that it has made possible an understanding between plant and office which is seldom attained.

Our cost man is a member of this club, and finds opportunity in every meeting to discuss with the other members some phase of plant costs. These meetings also, of course, make possible open discussion in which all members may participate.

This close coordination of these widely differing functions has done much to make our budget system highly satisfactory from every standpoint. All budget data are divided into departmental cost reports, showing actual operating cost against budget requirements. These reports are placed in the hands of the department heads or foremen as well as the plant management. Each report shows in detail all items of departmental expense directly controlled by the department head and he, of course, receives only the report which covers his particular department.

It is again readily seen that the foremen in our establishment, knowing exact costs, examine and scrutinize these monthly reports minutely and a rather close working connection between operating department and cost department is necessarily established, which means that costs are usually correct, to the minutest detail.

All of these individual reports are controlled by the cost summary, which makes it possible for plant management to find an immediate check-up in the detailed departmental reports of any item contained in the summary which may be questioned for some reason or other.

The cost department prepares a further report showing cumulative costs, and comparative costs between certain periods. This enables management to determine volume trend and cost trend. Any variation either up or down is immediately traced to its cause. Once the cause for the variation is discovered planning takes a rather definite course. We have actually eliminated guess work.

Our estimates on new work are sufficiently ahead so as to provide a barometer of expected volume; which makes possible a reasonable balance in the production departments and straightens out the production curve. This is of utmost importance in a plant such as ours, which is not as flexible as many other plants where not hand work but machine process presents the largest problems.

Presents a Summarized Picture

In concluding, I will repeat that our cost department does furnish management with the kind of information which is needed for plant control. Although there is a mass of detail, this is presented in a summarized picture which is easily read and understood. Furthermore, these reports reach management in good time, presenting the needed information when it is really wanted.

We do not find it necessary to maintain a large and expensive department to gather the statistics which management wants. Our complete accounting, costs, time-keeping and budget force does not comprise over fifteen employees.

Obituary

J. L. Nevill Smythe

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., April 30, 1928.—In the passing of J. L. Nevill Smythe, head of the firm bearing his name, the Quaker City suffers the loss of one of its most prominent associates, whose history was linked with the development of the wrapping paper industry of the city. Mr. Smythe, who was president of the J. N. Smythe Company, died at his home, 100 Summit avenue, Chestnut Hill, last week, following a prolonged illness with complications due to the infirmities of years. He was 74 years of age, his birthday having been celebrated on April 4.

Mr. Smythe, who was born in Canada, came to Philadelphia more than forty years ago. In 1900 he founded the present firm, of which he was head. In 1904 the business was incorporated under the laws of Pennsylvania when he became associated with Harvey E. Platt, now an officer of the company. Throughout the history of the company and under his able guidance the Smythe Company became one of the most prominent of wrapping paper and specialties houses in this section. During the war the business was extended to Australia, Cuba and Mexico.

Mr. Smythe was a former president of the Philadelphia Paper Trade Association and was an enthusiastic golfer, joining in all the tournaments of the Paper Trade Golfing Association. He was a leading member of the Philadelphia Cricket Club. In his early youth he was active in sports, winning several trophies for his prowess in cricket and other outdoor games. He was an active member of St. Paul's Protestant Episcopal Church, Chestnut Hill.

In the many years that he had been associated with the local trade he won a wide circle of friends among the paper fraternity and was highly esteemed by those linked with his business and whose welfare was a matter of personal interest. His genial contact with the members of his staff won for him these words of happy memory composed by one of the associates of the company:

The world's a little better,
And life seems more worth while
As you pass by, and leave behind
The memory of your smile.

As we journey along life's pathway
There's many a weary mile
That the road's made shorter, the burden lighter,
As you pass by, with your smile.

Sometimes, in the stress of life's battles,
We wonder if it's worth while,
But we straighten up, and start anew
As you pass by, with your smile.

Surviving him are his son, T. H. Butler Smythe, of the company, and his widow and three daughters.

Hollis W. Martin

[FROM OUR REGULAR CORRESPONDENT]

NORWOOD, N. Y., April 30, 1928.—Hollis W. Martin, president of the Martin Pulp and Paper Company of this place and widely known in northern New York paper manufacturing circles, was almost instantly killed when the automobile which he was driving was struck by a train at Plum Brook grade crossing. Mr. Martin had been associated with the pulp and paper making industry of this section practically all of his life and for years has headed his own company, the Martin Pulp and Paper Company, which is regarded as one of the thriving concerns of the north country.

The deceased was a 32nd degree Mason and a member of the Shriners and was connected with all the branches of the Masonic Order. His funeral held here on Wednesday witnessed one of the largest turnouts of Masons in this section in years, nearly two hundred members of the order from all parts of northern New York being in attendance. The floral tributes filled two large automobiles and included pieces from many pulp and paper firms in this section.

Following Mr. Martin's death it was learned that he carried insurance to the extent of $83,000. It is understood that this includes the double indemnity features now included in life insurance policies. Of this sum $50,000 is payable to the Martin Pulp and Paper Company, of Norwood, and the balance, $33,000, goes to the widow and son, who survive.

Box Board Production for March

WASHINGTON, D. C., April 30, 1928.—March production of box board, based on reports to the Department of Commerce by 91 firms operating 118 plants (reports for earlier months including four concerns now out of business) was 87.8 per cent of capacity, as compared with 87.9 per cent in February and 84.7 per cent in March, 1927. In the following table the capacity data vary according to the normal number of working days in each month:

Year and Month	Operation: Inch hours: Capacity	Operation: Inch hours: Operated	Operation: Per cent of Capacity	Production: Short Tons: Capacity	Production: Short Tons: Output	Production: Per cent of Capacity	New Orders: Short Tons	Unfilled Orders (end of month): Short Tons
1927								
January	9,997,400	6,998,505	70.0	240,175	173,629	72.3	194,285	105,669
February	9,597,504	7,583,477	79.0	230,568	189,273	82.1	183,861	102,005
March	10,797,192	8,627,946	79.9	259,389	219,824	84.7	230,065	114,369
April	10,397,296	7,771,040	74.7	249,782	205,589	82.3	197,435	101,861
May	9,997,400	7,759,515	77.6	240,175	198,710	82.7	192,616	93,248
June	10,397,296	8,200,254	78.9	249,782	213,196	85.4	212,227	94,847
July	9,997,400	7,413,384	74.2	240,175	189,875	79.1	212,434	115,097
August	10,797,192	8,885,602	82.3	259,389	232,723	89.7	227,397	112,763
Sept.	9,997,400	8,675,472	86.8	240,175	225,633	93.9	235,960	120,331
Oct.	10,397,296	8,902,325	85.6	249,782	226,141	90.8	221,548	105,600
Nov.	9,997,400	8,275,202	82.8	240,175	212,319	88.4	183,576	76,471
Dec.	10,397,296	7,443,536	71.6	249,782	186,920	74.7	178,224	74,430
Total (year)	122,768,072	96,536,258	78.6	2,949,349	2,473,832	83.9	2,469,628	.....
1928								
January	9,997,400	7,800,182	78.0	240,175	203,146	84.6	203,630	82,446
February	9,997,400	*8,160,317	81.6	240,175	*211,032	87.9	*215,256	*86,780
March	10,797,192	8,848,168	81.9	259,389	227,802	87.8	250,059	94,085

Year and Month	Shipments of boxboard: Short Tons	Stocks of boxboard, end of month: Short Tons	Consumption of waste paper: Capacity: Short Tons	Consumption of waste paper: Consumed: Short Tons	Per cent of Capacity	Stocks of waste paper, end of month: On hand: Short Tons	Stocks of waste paper, end of month: In transit and unshipped purchases: Short Tons
1927							
January	175,528	53,562	232,825	163,337	70.2	163,023	38,062
February	189,032	53,327	223,512	182,322	81.6	158,222	40,602
March	217,876	54,566	251,451	209,730	83.4	155,513	43,789
April	209,944	50,211	242,138	189,942	78.4	147,938	46,314
May	200,282	48,906	232,825	191,427	82.2	149,438	59,289
June	210,320	52,452	242,138	205,537	84.9	151,671	43,807
July	194,131	49,519	232,825	180,822	77.7	151,094	51,520
August	229,719	52,283	251,451	227,430	90.4	130,503	72,087
September	228,393	43,115	232,825	216,101	92.8	127,649	53,875
October	228,222	41,863	242,138	220,974	91.3	128,443	65,008
November	212,375	41,317	232,825	202,646	87.0	133,184	52,161
December	181,400	42,610	242,138	177,329	73.2	145,549	34,512
Total (year)	2,477,222		2,859,091	2,367,597	82.8	.....	.....
1928							
January	196,275	49,172	232,825	188,521	81.0	157,185	62,791
February	*209,653	*50,490	232,825	*192,521	82.7	*142,723	*60,918
March	238,117	40,428	251,451	209,806	83.4	139,775	47,582

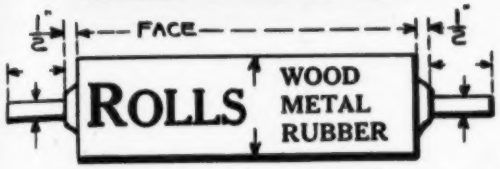
* Revised.

Go With Allied Paper Mills

Frank Mosteller, formerly vice president of the Kalamazoo Vegetable Parchment Company, has joined the general staff of the Allied Paper Mills, according to Alex G. Gilman, president. "Mr. Mosteller's experience in the paper business and general acquaintance among the trade is a very valuable acquisition to our force," said President Gilman in commenting on the new connection.

Joe. Wettenmann, a graduate of the Technical College of Paper Trade, at Altenberg, Germany, has been engaged as an assistant to W. K. Kidder, general chemist of the Allied Paper Mills.

RODNEY HUNT



Adopted as standard by prominent mills

Meet the Daily Test of Mill Use

Rodney Hunt **"Dead Set" Press Rolls** stand the test of Wet Machine use and cost 15 to 25% less than those of the old style rod and journal construction. A trial convinces.

RODNEY HUNT

If you need a
ROLL FOR ANY MACHINE
call or write

RODNEY HUNT MACHINE CO.
63 Maple St., ORANGE, MASS.

INTERNATIONAL ACCEPTANCE BANK
INCORPORATED

International
Banking Transactions

Commercial Letters of Credit
Collections Foreign Exchange
Investment Securities
Bullion and Currency

PAUL M. WARBURG, *Chairman* F. ABBOT GOODHUE, *President*

52 Cedar Street, New York

ENGINEERS

Power plants—additions—complete paper mill projects

ONE great organization—a specialist in paper mill engineering and construction—designs, builds, rebuilds, reports, appraises, for many of the most important concerns in the paper industry. Plans, price, construction work, delivery date, owner's satisfaction, all guaranteed.

Ferguson customers include:

Hinde & Dauch Co.
A. P. W. Paper Co.
Mead Pulp and Paper Co.
Chillicothe Paper Co.
Warren Mfg. Co.
Spencer-Wynne Paper Products Company
Bennington Wax Paper Company
Oswego Falls Corp.
Fairfield Paper Co.

THE H. K. FERGUSON COMPANY
Hanna Bldg. • Cleveland, Ohio • Phone: SUp. 3620
New York • Detroit • Birmingham • Tokio, Japan

Ferguson
ENGINEERS

BROWN COMPANY'S

ALPHA

is the demonstrated result of this Company's forty years of research in pulp making.

¶ It now ranks among the preferred materials for the making of higher grade papers.

¶ It yields the papermaker a profit and gives his patrons more than their money's worth.

BROWN COMPANY
founded 1852
PORTLAND MAINE

NEW YORK CHICAGO ST. LOUIS MINNEAPOLIS
BOSTON PITTSBURGH ATLANTA SAN FRANCISCO

Imports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING APRIL 28, 1928

SUMMARY

Cigarette paper	162 cs.
Wall paper	64 bls., 32 cs.
Paper hangings	38 bls., 35 cs.
News print	481 rolls, 50 bls.
Printing paper	76 bls., 288 cs.
Wrapping paper	25 cs.
Packing paper	7 cs.
Parchment paper	144 bls.
Stencil paper	79 cs.
Tracing paper	2 cs.
Tissue paper	1 ble., 6 cs.
Colored paper	6 cs.
Surface coated paper	44 cs.
Coated paper	10 cs.
Litho paper	30 cs.
Vellum paper	1 cs.
Pith paper	2 cs.
Writing paper	16 cs.
Decalcomania paper	12 cs.
Grease proof paper	9 cs.
Filter paper	20 bls.
Miscellaneous paper	29 pkgs., 159 cs.

CIGARETTE PAPER

De Manduit Paper Corp., Schodack, Havre, 158 cs.

J. V. Lago, Hellen, Alicante, 4 cs.

WALL PAPER

J. E. Bernard & Co., Arabic, Antwerp, 8 bls., 1 cs.

F. J. Emmerich, New York, Hamburg, 3 bls.

Cassidy Hicks Wallpaper Co., New York, Hamburg, 1 cs.

Globe Shipping Co., New York, Hamburg, 12 bls.

A. C. Dodman, Jr., Inc., American Banker, London, 1 cs., 3 bls.

W. H. S. Lloyd & Co., American Banker, London, 8 bls.

F. J. Emmerich, Baltic, Liverpool, 18 bls.

F. J. Emmerich, Minnesota, London, 12 bls.

J. E. Bernard & Co., Olympic, Southampton, 6 cs.

Thomas & Pierson, Olympic, Southampton, 1 cs.

Hensel, Bruckman & Lorbacher, Olympic, Southampton, 10 cs.

C. A. Haynes & Co., Mauretania, Southampton, 12 cs.

PAPER HANGINGS

Whiting & Patterson Co., Inc., Berengaria, Southampton, 4 cs.

A. C. Dodman, Jr., Inc., Carmania, Liverpool, 3 bls.

A. C. Dodman, Jr., Inc., Baltic, Liverpool, 12 bls.

W. H. S. Lloyd & Co., Minnesota, London, 23 bls., 10 cs.

Whiting & Patterson Co., Inc., Olympic, Southampton, 10 cs.

Whiting & Patterson Co., Inc., Mauretania, Southampton, 11 cs.

NEWS PRINT

Parsons & Whittemore, Inc., Berlin, Bremen, 307 rolls.

A. S. Zabriskie, Berlin, Bremen, 96 rolls.

Walker, Goulard, Plehn Co., Berlin, Bremen, 50 bls.

Watch Tower Bible & Tract Society, Sparreholm, Hango, 78 rolls.

PRINTING PAPER

P. C. Zuhlke, Arabic, Antwerp, 77 cs.

Perkins, Goodwin & Co., New York, Hamburg, 5 cs.

International Forwarding Co., Carlier, Antwerp, 5 cs.

Perkins, Goodwin & Co., Thuringia, Hamburg, 184 cs., 76 bls.

E. Dietzgen & Co., Thuringia, Hamburg, 17 cs.

WRAPPING PAPER

Birn & Wachenheim, Arabic, Antwerp, 25 cs.

PACKING PAPER

S. Gilbert, Berlin, Bremen, 3 cs.

International Forwarding Co., New York, Hamburg, 4 cs.

PARCHMENT PAPER

Wilkinson Bros. & Co., Inc., Innoko, Rotterdam, 118 bls.

Walker, Goulard, Plehn Co., New York, Hamburg, 26 bls.

STENCIL PAPER, ETC.

Arlac Dry Stencil Co., New York, Hamburg, 79 cs.

TRACING PAPER

Keuffel & Esser Co., New York, Hamburg, 2 cs.

TISSUE PAPER

F. C. Strype, Casper, Hango, 4 cs.

R. Hoe & Co., American Banker, London, 1 ble.

G. W. Sheldon & Co., American Banker, London, 2 cs.

COLORED PAPER

Borden Riley Paper Co., Arabic, Antwerp, 6 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Arabic, Antwerp, 40 cs.

Whiting & Patterson Co., Inc., New York, Hamburg, 4 cs.

COATED PAPER

Globe Shipping Co., New York, Hamburg, 10 cs.

LITHO PAPER

Fuchs & Lang Manfg. Co., Calcutta Maru, Hong Kong, 30 cs.

VELLUM PAPER

Steffens Jones Co., Calcutta Maru, Kobe, 1 cs.

PITH PAPER

Nosawa Co., Calcutta Maru, Kobe, 2 cs.

WRITING PAPER

Strawbridge & Clothier, Berlin, Bremen, 2 cs.

Globe Shipping Co., Berengaria, Southampton, 3 cs.

J. J. Gavin & Co., Berengaria, Southampton, 7 cs.

Globe Shipping Co., New York, Hamburg, 1 cs.

Japan Paper Co., Ile de France, Havre, 3 cs.

DECALCOMANIA PAPER

L. A. Consmiller, Berlin, Bremen, 12 cs.

GREASE PROOF PAPER

American Express Co., New York, Hamburg, 9 cs.

FILTER PAPER

A. Giese & Son, Olympic, Southampton, 20 bls.

MISCELLANEOUS PAPER

Keller Dorian Paper Co., Ile de France, Havre, 6 cs.

Canson & Montgolfier, Ile de France, Havre, 29 pkgs.

Standard Products Corp., Ile de France, Havre, 153 cs.

RAGS, BAGGINGS, ETC.

A. W. Fenton, Inc., Berlin, Bremen, 41 bls. rags.

Gallagher & Ascher, Innoko, Rotterdam, 125 bls. rags.

Banco Com'l Italiana Trust Co., Innoko, Rotterdam, 142 bls. cotton waste.

Castle & Overton, Inc., Schodack, Havre, 195 bls. rags.

V. Galaup, Schodack, Havre, 470 bls. rags.

W. Steck & Co., Schodack, Havre, 137 bls. jute waste.

V. Galaup, Schodack, Dunkirk, 86 bls. rags.

E. J. Keller Co., Inc., Schodack, Dunkirk, 22 bls. new rags.

E. J. Keller Co., Inc., Schodack, Havre, 117 bls. new rags.

Equitable Trust Co., Schodack, Havre, 50 bls. rags.

Castle & Overton, Inc., Schodack, Havre, 46 bls. rags.

R. Canovai & Sons, Inc., Burma, Bari, 39 bls. rags.

Castle & Overton, Inc., Burma, Venice, 188 bls. rags.

Castle & Overton, Inc., Carmania, Liverpool, 72 bls. bagging.

H. Burrows, Carmania, Liverpool, 9 bls. rags.

N. Y. Trust Co., Hellen, Barcelona, 70 bls. rags.

E. J. Keller Co., Inc., Hellen, Barcelona, 76 bls. rags.

A. C. Feterolf, Baltic, Liverpool, 8 bls. rags.

Goldman, Sachs & Co., Carlier, Antwerp, 84 bls. rags.

American Exchange Irving Trust Co., Thuringia, Hamburg, 80 bls. rags.

Chase National Bank, Thuringia, Hamburg, 285 bls. rags.

A. W. Fenton, Inc., Thuringia, Hamburg, 93 bls. rags.

Castle & Overton, Inc., Archimedes, Buenos Aires, 234 bls. rags.

American Over-Ocean Corp., Calcutta Maru, Kobe, 43 bls. rags.

E. J. Keller Co., Inc., Westerner, Antwerp, 366 bls. flax waste.

American Rag Trading Co., Clara Camus, Alexandria, 32 bls. bagging.

E. J. Keller Co., Inc., Clara Camus, ——, 241 bls. rags.

Banco Com'l Italiana Trust Co., Brazil Maru, Naples, 171 bls. bagging.

Banco Com'l Italiana Trust Co., Brazil Maru, Leghorn, 52 bls. rags.

Banco Com'l Italiana Trust Co., Carnia, Leghorn, 301 bls. bagging.

E. J. Keller Co., Inc., Talisman, Antwerp, 204 bls. flax waste.

OLD ROPE

Brown Bros. & Co., Chicago City, Bristol, 88 coils.

Brown Bros. & Co., Idaho, Hull, 104 coils.

American Exchange Irving Trust Co., Thuringia, Hamburg, 27 bls.

CASEIN

M. E. Clarendon, Archimedes, Buenos Aires, 250 bags.

National City Bank, Archimedes, Buenos Aires, 334 bags.

Tradesmans National Bank, Archimedes, Buenos Aires, 256 bags.

Kalbfleisch Corp., Western World, Buenos Aires, 2,084 bags.

National City Bank, Western World, Buenos Aires, 417 bags.

CHINA CLAY

J. Dixon Crucible Co., Thuringia, Hamburg, 400 bags, 19,860 ks.

WOOD PULP

Parsons & Whittemore, Inc., Drottningholm, Gothenburg, 108 bls. sulphite.

M. Gottesman & Co., Inc., Burma, Sebenico, 2,000 bls. wood pulp.

Bulkley, Dunton & Co., New York, ——, 125 bls. wood pulp, 25 tons.

Atterbury Bros., Inc., Stavangerfjord, Oslo, 500 bls. wood pulp.

Perkins, Goodwin & Co., Stavangerfjord, Drammen, 250 bls. sulphite.

Chemical National Bank, Stavangerfjord, Oslo, 300 bls. sulphite.

J. Andersen & Co., Pres. Wilson, Trieste, 500 bls. wood pulp.

Castle & Overton, Inc., Thuringia, Hamburg, 1,268 bls. wood pulp.

E. J. Keller Co., Inc., Thuringia, Hamburg, 1,000 bls. wood pulp.

Chemical National Bank, Thuringia, Hamburg, 128 bls. sulphite, 25 tons.

WOOD FLOUR

B. L. Soberski, Stavangerfjord, Frederickstad, 1,500 bags.

PHILADELPHIA IMPORTS

WEEK ENDING APRIL 28, 1928

Green Hamilton & Co., Innoko, Rotterdam, 107 bls. thread waste.

E. J. Keller Co., Inc., Innoko, Rotterdam, 230 bls. rags.

G. W. Millar & Co., Inc., Innoko, Rotterdam, 62 bls. rags.

S. E. Ingber, Innoko, Rotterdam, 138 bls. cottons.

Castle & Overton, Inc., Ala, Antwerp, 1,259 bls. rags.

Equitable Trust Co., Ala, Antwerp, 41 bls. rags.

P. Berlowitz, Ala, Antwerp, 164 bls. rags.

Salomon Bros. & Co., Ala, Antwerp, 12 bls. rags.

MacBlaine Co., Ala, Antwerp, 35 bls. rags.

E. J. Keller Co., Inc., Ontario, Havre, 100 bls. bagging.

E. J. Keller Co., Inc., Ontario, Havre, 176 bls. rags.

National Bank of Phila., Ontario, Havre, 29 bls. rags.

Equitable Trust Co., Ontario, Havre, 128 bls. rags.

Fidelity Trust Co., Ontario, Havre, 174 bls. rags.

Castle & Overton, Inc., Ontario, Havre, 106 bls. rags.

State Bank, Ontario, Havre, 192 bls. rags.

Southwark National Bank, Ontario, Dunkirk, 173 bls. rags.

E. J. Keller Co., Inc., Ontario, Dunkirk, 166 bls. flax waste.

M. Friedman, Westerner, Antwerp, 164 bls. rags.

Castle & Overton, Inc., Westerner, Antwerp, 436 bls. rags.

Equitable Trust Co., Westerner, Antwerp, 94 bls. rags.

E. Mayer, Westerner, Antwerp, 138 bls. rags.

S. Birkenstein & Sons, Carnia, Genoa, 213 coils old rope.

Castle & Overton, Inc., Texas, Denmark, 101 bls. rags.

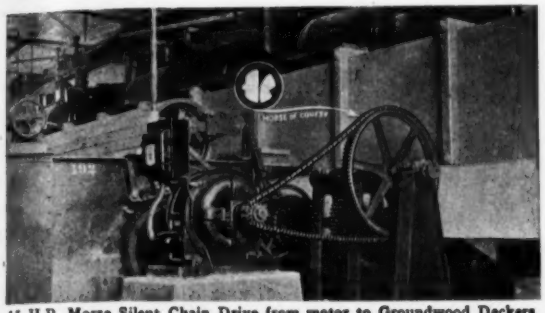
Castle & Overton, Inc., London Mariner, England, 75 bls. rags.

Castle & Overton, Inc., Sacandaga, Belgium, 261 bls. rags.

Castle & Overton, Inc., Bristol City, England, 217 bls. rags.

Castle & Overton, Inc., City of Flint, England, 286 bls. rags.

(*Continued on page 78*)



15 H.P. Morse Silent Chain Drive from motor to Groundwood Deckers Driver, 860 r.p.m.; Driven, 131 r.p.m., 42 inch centers.

Improved Drive Service

The improved type No. 55 Morse Rocker Joint insures even greater satisfaction from Morse Silent Chain Drives. Changes in the contour of the rocker pin and an increase of cross section of the seat pin make a more rugged joint, heavier and more durable. Morse Transmission Engineers will gladly show you how Morse Drives are giving even greater years of service—just address the nearest office below.

MORSE CHAIN CO., Ithaca, N.Y., U.S.A.

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Charlotte, N. C.
Chicago, Ill.
Cleveland, Ohio
Denver, Colo.
Detroit, Mich.
Louisville, Ky.
Minneapolis, Minn.
New Orleans, La.
New York, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
San Francisco, Calif.
St. Louis, Mo.
Toronto, 2, Ont., Canada
Winnipeg, Man., Canada

Ⓜ 2365

MORSE SILENT CHAIN DRIVES

FIDALGO DRYING SYSTEMS

(Patented)

PULP CHIPS BARK

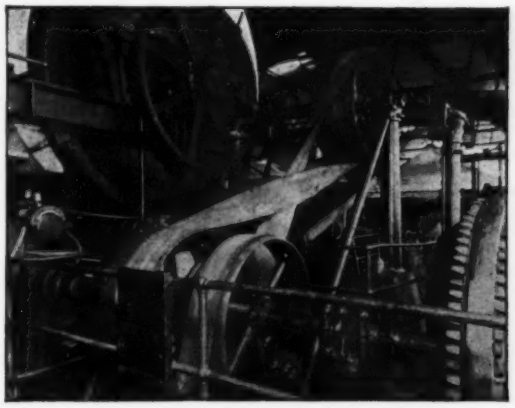
FEATURES—Largest factory production and greatest experience in field.
WE FURNISH complete system for bleached or unbleached stock, insuring lowest operating cost, minimum floor space, cleanliness, high test and simple baling method for domestic and export shipments.

LATEST INSTALLATIONS—Union Bag and Paper Power Corporation, Tacoma, Wash.; Shaffer Box Company, Tacoma, Wash.

Technical Economist Corporation

40 RECTOR STREET, NEW YORK, N. Y.
Telephone Whitehall 5243 Cable Herenco

RHOADS TANNATE WATERSHED LEATHER BELTING



3,297 BELTS, 67% LEATHER

ONE paper mill uses 3,297 belts, exclusive of conveyors, and sixty-seven per cent of them are leather. This shows one mill's attitude regarding the comparative value of leather and fabric belts.

Recently in another mill a 36-inch, 3-ply Tannate Watershed Belt was installed to replace a 36-inch, 10-ply rubber. The rubber belt slipped so badly that they had to increase the speed of the engine to deliver sufficient pulp.

The Tannate Belt took hold immediately and pulled the maximum load so easily that they cut down the speed to eliminate the excess pulp being pumped into the Jordans. Tannate has the grip and long life that makes it pay.

Send for our Tannate Booklet with the Rhoads Service Guarantee.

J. E. RHOADS & SONS

PHILADELPHIA .....37 North Sixth Street
NEW YORK .....104 Beekman Street
CHICAGO .....324 West Randolph Street
ATLANTA .....70 Forsyth Street, S. W.
CLEVELAND .....1224 W. Ninth Street
Factory and Tannery: Wilmington, Del.

STANDARD SELF-ALIGNING

3 Important Features
Rustproof Plates
Self Aligned Plates
Self Aligned Rivets

Write for Samples

The BOURNE-FULLER CO. UPSON WORKS UNIONVILLE, CONN.

BELT FASTENERS

Imports of Paper and Paper Stock

(*Continued from page 76*)

Castle & Overton, Inc., McKeesport, France, 452 bls. rags.
Castle & Overton, Inc., Iserholm, Germany, 2,000 bls. wood pulp.
Castle & Overton, Inc., Nordvard, Germany, 734 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING APRIL 28, 1928

The Borregaard Co., Inc., Sagoporack, Sarpsborg, 1,200 bls. wood pulp, 250 tons.
The Borregaard Co., Inc., Sagoporack, Hurum, 3,300 bls. wood pulp, 550 tons.

CHARLESTON IMPORTS

WEEK ENDING APRIL 28, 1928

Castle & Overton, Inc., Fluor Spar, Germany, 49 bls. bagging.

BOSTON IMPORTS

WEEK ENDING APRIL 28, 1928

Green Hamilton & Co., Innoko, Rotterdam, 274 bls. cotton waste.
M. Gottesman & Co., Inc., Burma, Sebenico, 4,000 bls. wood pulp.
J. Andersen & Co., Burma, Trieste, 2,249 bls. wood pulp.
J. Andersen & Co., Sagoporack, Sarpsborg, 3,900 bls. sulphite, 650 tons.
Brown Bros. & Co., Idaho, Hull, 139 coils rope.
Crocker, Burbank & Co., Idaho, Hull, 75 bls. waste paper.
G. M. Graves Co., Clara Camus, Alexandria, 200 bls. rags.
Bulkley, Dunton & Co., American, ——, 2,000 bls. wood pulp.
Bulkley, Dunton & Co., Binnendyk, ——, 500 bls. wood pulp.
Bulkley, Dunton & Co., Lorain, ——, 1,625 bls. wood pulp.
Bulkley, Dunton & Co., Mexicano, ——, 400 bls. wood pulp.
Bulkley, Dunton & Co., Minnesotan, ——, 1,200 bls. wood pulp.
Bulkley, Dunton & Co., Sparreholm, ——, 750 bls. wood pulp.
Bulkley, Dunton & Co., Virginian, ——, 420 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING APRIL 28, 1928

R. J. Reynolds Tobacco Co., Schodack, Havre, 200 cs. cigarette paper.
Congoleum Nairn Co., Schodack, Havre, 101 bls. bagging.
Congoleum Nairn Co., Schodack, Havre, 977 bls. rags.
National City Bank, Ontario, Havre, 358 bls. bagging.
National City Bank, Ontario, Dunkirk, 421 bls. rags.
M. Gottesman & Co., Inc., Casper, Hango, 2,010 bls. wood pulp, 331 tons.
Congoleum Nairn Co., Westerner, Antwerp, 621 bls. rags, 88 bls.
Congoleum Nairn Co., Westerner, Antwerp, 443 bls. bagging.
Castle & Overton, Inc., Iserholm, Germany, 734 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING APRIL 28, 1928

Castle & Overton, Inc., Winston Salem, France, 585 bls. rags.
Castle & Overton, Inc., Vogesen, Germany, 100 bls. bagging.

NORFOLK IMPORTS

WEEK ENDING APRIL 28, 1928

E. Butterworth & Co., Inc., Westerner, Antwerp, 250 bls. bagging.
N. Y. Trust Co., Westerner, Antwerp, 130 bls. bagging.
British American Tobacco Co., Westerner, Antwerp, 56 cs. printed cigarette wrappers.

Send Out Simplification Questionnaire

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 2, 1928.—H. R. Colwell, of the Simplified Practice Division, Department of Commerce, is sending a questionnaire to paper manufacturers to ascertain, if possible, what adherence there has been to the simplified practice recommendation which was accepted several years ago. Mr. Colwell, in his letter to the manufacturers, says:

Simplified Practice Recommendation No. 22, Paper, will be considered for revision or reaffirmation through a meeting of the Standing Committee to be held some time in the near future.

Past experiences of this Division with other industries have proven that periodic resurveys covering Simplified Practice Recommendations are essential in order to keep abreast of current practice; promote greater adherence; insure a larger degree of application, and provide the necessary material for the use of the Standing Committee for an intelligent revision or reaffirmation.

The chairman of the standing committee appointed by the general conference and responsible to the industry, has requested the Division of Simplified Practice of the Department of Commerce to serve his committee to the extent of making this survey, and the attached inquiry form has been prepared in the interest of the simplification program.

The information secured through this method will be analyzed and compiled, by the Division of Simplified Practice, into a composite report, without disclosure of any individual return, for the exclusive use of the standing committee.

I trust you will find it convenient to fill in the inquiry form at once, and return it to us in the inclosed official envelope which requires no postage. The questionnaire itself is as follows:

SIMPLIFIED PRACTICE RECOMMENDATION NO. 22
PAPER

Stock sizes, general printing and publishing:
26 by 29 inches, 29 by 52 inches.
25 by 38 inches, 38 by 50 inches.
32 by 44 inches, 44 by 64 inches.
35 by 45½ inches.
Stock sizes, book publishers:
30½ by 41 inches, 41 by 61 inches.
Forms and letterheads:
17 by 22 inches, 22 by 34 inches.
17 by 28 inches, 26 by 34 inches.
19 by 24 inches, 24 by 38 inches.

INFORMATION TO COVER CALENDAR YEAR 1927

1. Please estimate the percentage of your production or sale of Paper for 1927 which was in the standard stock sizes as shown in S. P. R. No. 22.

2. Is the demand for non-standard stock sizes sufficiently large to warrant any change in Simplified Practice Recommendation No. 22?

3. Does the present consumer demand indicate that further eliminations can be advantageously effected?

4. What measures, if any, are you using to promote, establish, and sell the simplified line?

a—Cataloguing items with distinguishing marks indicating simplified line.

b—Cataloguing only simplified items.

c—Instructing salesmen to sell only simplified lines.

d—Promoting simplified line through articles in trade papers, individual pamphlets, associational organs, or company advertising. (State method, if any.)

e—Is there any price differential favoring the simplified lines as against non-standard items?

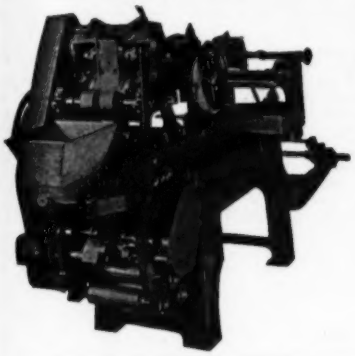
5. Have you experienced any benefits from the operation of S. P. R. No. 22?

McCormick Addresses Wasco Club

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., April 30, 1928.—James C. McCormick, assistant treasurer of Knowlton Brothers, Inc., delivered an interesting address which was the feature of the weekly meeting of the Wasco Club of Watertown. Mr. McCormick spoke on industrial problems now confronting pulp and paper firms in Northern New York. He said that the industrial situation is in a slump at the present time throughout the state and recommended as the only remedy the election of representatives in Washington and Albany who realize the importance of the state's industries and who are prepared to advocate legislation favorable to industry.

Mr. McCormick spoke interestingly and at length about the Knowlton Brothers Company, describing the plant and its products. He said that nearly all cone loud speakers used on radios are made from paper specially prepared by the Knowlton company. He called attention to the fact that George W. Knowlton although he is in his eightieth year, hale and hearty, is still the active head of the Knowlton company.

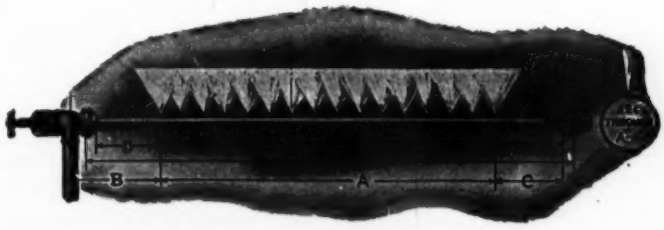


HIGHEST SPEED
Paper Bag Machinery

Get My Quotations Before Placing Your Orders
Special Machinery Designed and Built

A. L. PARRISH,
1702 Robinson St., South Bend, Ind.

THE "RAINSTORM" SHOWER PIPE



MANUFACTURED BY

THE SMITH & WINCHESTER MFG. CO.
SOUTH WINDHAM, CONN.

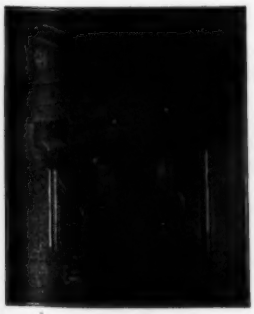
ESTABLISHED 1828

A Complete Line of Paper Bag Making Machinery

BUILDERS OF DEPENDABLE MACHINERY FOR THE PAPER MILL

The Undercut Trimmer

Die Cutting Presses



TYPE "B" IRON EXTRACTOR
for PAPER MAKING

It consists of special magnetic surfaces of great power over which the paper stuff is made to pass. As a result, all the iron and many other foreign substances are completely extracted. Hundreds of these devices are in use daily and no one of them has failed to give complete satisfaction. Write us for Bulletins and full data.

THE ROLAND T. OAKES CO., Holyoke, Mass.

Electrical Specialists. ***Established 1885***

Paper Mill Stocks and Bonds

Quoted by Messrs. McGay & Co., 25 Broad street, New York City, to whom all inquiry for quotations on these or any other Securities is referred.

BONDS	BID	ASKED
Abitibi Fibre Company 6s, 1947	100½	102
Abitibi Power & Paper 6s, 1940	104½	106½
Abitibi Power & Paper 6s, serially to 1934	100½	102½
A. P. W. Pulp & Power 7s, 1945	101½	103½
American Writing Paper 6s, 1947	87½	89½
Bastrop Pulp & Paper 6½s, 1940	103½	105½
Beaver Board 8s, 1933	101½	103
Beaver Products Corp. 7½s, 1942	109	111
Bedford Pulp & Paper 6½s, 1942	98	100
Belgo-Canadian Paper 6s, 1943	103	105
British-Columbia Pulp & Paper 6s, 1950	89	91
Brompton Paper Serial A 6s, 1946	101½	103½
Brompton Pulp & Paper 6s, 1935	100	...
Brown Paper Mills Serial 6s, 1941	99	101
Brown Company 5½s, 1946	102	104
Bryant Paper 6s, 1942	100½	102
Canadian Paper Board 7s, 1937	97½	99½
Cape Breton Pulp & Paper 6s, 1932	103	...
Celotex Company 6s, 1929	97	99
Celotex Company 6½s, 1939	100	102
Celotex Company of Chicago Debenture 6s, 1936	94½	96½
Central Paper Company Serial 6½s, 1942	86	89
Central Paper 7s, 1934	85	90
Champion Coated Paper Serial 6½s, 1934	100	...
Champion Coated Fibre Notes 6s, 1941	100	102
Champion Fibre Notes 6s, 1941	100	102
Champion Fibre Notes 8s, 1930	100	...
Champion Paper Corp. 6s, 1945	95	98
Chicago Mill & Lumber Serial 5½s, 1936	98	100
Container Corp. of America Debenture 6s, 1936, ex-warrants	96	99
Continental Paper Products 6½s, 1943	92	95
Cornell Wood Products 7½s, 1937	103	...
Crown Willamette 6s, 1951	102	103½
Dells Paper & Pulp Serial 6s, 1938	95	98
Dixon Board Mills Serial 6s, 1942	60	...
Donnacona Paper 5½s, 1948	97½	99
Eastern Manufacturing Co. 7s, 1938	96	98
Escanaba Paper Serial 6s, 1939	98	100
Escanaba Paper 6½s, 1935	96	99
Filer Fibre Serial 7s, 1935	90	95
Fort Orange Paper 7s, 1942	101½	103
Fort William Paper 6s, 1946	101	104
Fox River Paper 7s, 1931	100	...
Fraser Company 6s, 1950	103	105
Hammermill Paper Serial 6s, 1939	101	...
Hawley Pulp & Lumber 6s, 1946	96	...
Hawthorne Paper Company 6s, 1937	80	...
Hoberg Paper & Fibre 7s, 1937	95	97
Industrial Fibre Corp. Debenture 8s, 1933	100	...
International Paper 6s, 1955	104	106
International Paper 5s, 1947	101	103
Itasca Paper & Prairie River Paper Serial 5½s, 1938	99½	...
Itasca Paper & Prairie River Paper Serial 6s, 1938	99	...
Jessup & Moore First 6s, 1945	88	92
Kalamazoo Vegetable Parchment 6s, 1938	99	101
Lake Superior Pulp & Paper 6s, 1941	105	108
Manitoba Paper 6½s, 1936	102½	104½
Marathon Paper Mills Serial 5½s, 1942	99½	101
Marathon Paper Mills Serial 6s, 1937	100	...
Marinette & Menominee 7½s, 1936	103	105
Mead Pulp & Paper 5% Notes Serially, 1937	95	100
Mead Fibre 7s, 1937	98	101
Menosha Printing & Carton 6½s, 1939	99½	...
Midwest Box Company 6½s, 1940	100	...
Minnesota Ontario Paper Serial 6s, 1945	99	101
Murray Bay Paper 6½s, 1947	103	105
Munissing Paper Serial 6s, 1936	98	...
Nekoosa Edwards Paper 6s, 1942	96	...
Ontario Pulp & Paper 6s, 1931	108½	110½
Orono Pulp & Paper 6s, 1943	99	...
Orono Pulp & Paper 5s, 1941	96½	...
Oswegatchie Paper Serial 6s, 1932	95	100
Oswego Falls Corp. 6s, 1941	99	102
Oxford Paper 6s, 1947	102½	...
Oxford Paper 6s, 1947	102½	...
Paepcke Paper Mills 7s, 1930	99	...
Parker-Young Company 6½s, 1944	98	100
Paterson Parchment Paper 6s, 1938	101½	103
Penobscot Chemical Fibre 6s, 1942	102	105
Port Alfred Pulp & Paper 6½s, 1943	105	107
Port Alfred Pulp & Paper 5½s, 1947	98½	100
Price Brothers 6s, 1943	105	...
Provincial Paper 5½s, 1947	98½	...
Provincial Paper 6s, 1940	100	...
Queen City Paper 7s, 1933	97	100
Richardson & Company 6s, 1938	100	...
River Raisin Paper 6s, 1936	99	101
Riordan Pulp & Paper 6s, 1942	102	104
Rolland Paper 6s, 1937	99	101
St. Anne Paper 6½s, 1946	102	104
St. Croix Paper Serial 5s, 1937	99	...
St. Helen Pulp & Paper 6½s, 1931	99	102
St. Lawrence Paper Mills 6s, 1946	101½	103½
St. Lawrence Paper Mills 6½s, 1936	100½	102½
St. Maurice Valley Corp. 6s, 1945	102	104
St. Maurice Valley Corp. 5½s, 1947	98½	100½
St. Regis Paper of Canada 6s, 1931	100½	102
St. Regis Paper of Canada 6½s, 1934	100	101
Smith (Howard) Paper Mills 6s, 1934	101	...
Smith (Howard) Paper Mills 7s, 1941	104	106
Southern Paper Company 6½s, 1937	100	...
Spanish River Pulp & Paper 6s, 1931	108	110
Stevens-Thompson Paper 6s, 1942	94	96
Taggart Brothers 6s, 1944	95	100
Tait Paper & Color Industries 6s, 1935	90	95
Ticonderoga Pulp & Paper 5s, 1930	94	...
Ticonderoga Pulp & Paper 6s, 1940	100	102
Tomahawk Kraft Paper 6s, 1938	98	...
Tomahawk Pulp Paper 7s, 1932	99	...
Tonawanda Paper 5½s, Series 1941	99	102
U. S. Envelopes 5s, Series 1934	99	...
Union Bag & Paper Power 6s, 1932	98	100
United Wall Paper Factories 6s, 1947	96	99
Warren (S. D.) Company 6s, 1945	103	105
Watab Paper 6½s, 1942	102½	104½
Waterway Paper Products 6s, 1931	100½	101½
Wayagamack Pulp & Paper 6s, 1951	103	105
Westfield River Paper Serial 7s, 1943	89	93
Whitmer-Parsons Pulp & Lumber 8s, 1938	13	20
Whitaker Paper 7s, 1942	106	...

STOCKS	BID	ASKED
American Box Board, Pfd.	9¼	10¼
American Box Board, Com.	9¼	10¼
Am. Tissue Mills, 7% Pfd.	90	93
British Columbia P. & P., Pfd.	66	71
Brompton Pulp & Paper, 8% Pfd.	100	102
Brown Corpn., 7% Pfd.	104	None Off.
Champion Fibre, 7% Pfd.	108	110
Diem & Wing, 7% Cum. Pfd.	92	97
Eastern Mfg. Co., 1st Pfd.	44	46
Great Northern Paper, Com.	94	96
Hammermill Paper, 7% Pfd.	108	110
Hinde & Dauch, Com.	135	None Off.
Hinde & Dauch, 6% Pfd.	102	None Off.
Holyoke Card & Paper	160	None Off.
Marathon Paper Mills, Com.	125	...
Midwest Box Co., 8% Pfd.	98	102
Midwest Box Co., 6% Pfd.	95	99
Louis De Jonge Co., 7% Pfd.	94	97
Oxford Papers, Com.	170	180
Oxford Paper Co., Pfd.	109	111
Penobscot Chemical Fibre, Com.	70	80
Richardson Co., Com.	180	200
Rubberoid	102	105
Sabin Robbins Paper Co., 7% Pfd.	105	110
St. Croix Paper	150	170
St. Regis Paper Co., 7% Cum. Pfd.	106½	109
Westfield River Paper Co., 1st Pfd.	Wanted	None Off.
West Virginia Pulp and Paper Company	57	62
West Virginia Pulp & Paper, Pfd.	102	105
Whittaker Paper, 7% Cum. Pfd.	105	None Off.

Lower Paper Consumption in Italy

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 9, 1928.—Lower domestic consumption, followed by lower production featured by a discouraging year in 1927 in the opinion of the Italian paper industry, according to the Paper Division, Department of Commerce. Domestic consumption of paper which absorbs the greater part of Italian output fell steadily last year and in turn necessitated a reduction in production.

The situation was reported further complicated by the steady appreciation of the lira since the fall of 1926 which was not accompanied by an equal decline in prices. This the trade declares resulted in hand-to-mouth buying which added its adverse affect on the export paper trade. The rise in lira value might have been expected to stimulate imports and probably would have had that effect it was said but for the high import duty on foreign papers.

Manufacturers of printing, writing, and wrapping papers are so far reported to have suffered most keenly from the general business depression. Consumption of wrapping paper on the home market, which is most important, has been seriously curtailed by the slowness in the cotton and silk industries. Manufacturers of this line are reported further embarrassed by the conflicting regulations imposed by different communities with regard to paper used in the wrapping of foodstuffs and other edible products. Fall in news print consumption, however, has been even greater, following the suppression of a large number of newspapers, the amalgamation of others, and the general movement toward a reduction in the size and number of pages. There has also been evidence of a general economy in the use of paper in advertising, catalogues, and pamphlets.

According to reliable estimates, news print production in Italy during 1927 amounted to only 42,000 short tons as against 70,000 tons in the preceding year. Imports during the same period declined from 16,300 tons to 13,000 tons and exports from 5,400 tons to 3,000 tons, a reduction of 28,900 tons, or 36 per cent, alone in the domestic consumption of this one class. Imports of chemical pulp, however, for which the Italian paper industry depends to a large extent on foreign sources, dropped from 138,621 tons during the first 11 months of 1926 to 115,192 tons during the corresponding period in 1927.

BOLTON QUALITY

JOHN W. BOLTON & SONS, INC.

EAGLE KNIFE & BAR WORKS

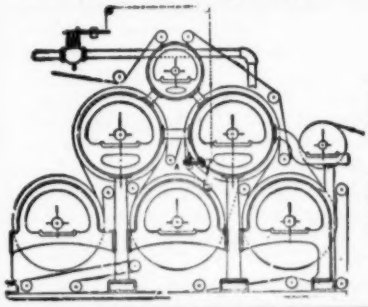
Lawrence, Mass.

The only firm making KNIVES for every machine from wood pile to finishing room.

It's the KNIVES that do the work!

The Pickles Drying Regulator **WE ARE SAFE IN OUR PROPOSITION**

YOU'LL MAKE NO MISTAKE IN ACCEPTING IT



Pickles Drying Regulator

will do everything we claim for it and more. The test costs you nothing until you are satisfied. Many mills tried one and now have every machine equipped. Write for list of users and other information.

W. F. PICKLES **Buckland, Conn.**

Low pressure steam for heating and drying is readily obtained from live steam lines by using

REDUCING VALVES

Auld (diaphragm) and Schutte (relay-controlled) types

These valves maintain uniform reduced pressure regardless of fluctuations in initial pressure or flow.

SEND FOR BULLETIN 8-R

SCHUTTE & KOERTING CO. 1255 N. 12th STREET PHILADELPHIA, PA.

Cotton and Paper Rolls
Super Calenders
Friction Calenders
Embossing Calenders
Hydraulic Presses and Pumps

Successors to the Granger Foundry & Machine Co.

The Textile-Finishing Machinery Company

PROVIDENCE, R. I.

New York Market Review

Office of THE PAPER TRADE JOURNAL,
Wednesday, May 2, 1928.

Conditions in the local paper market were fairly satisfactory during the past week. Contract withdrawals were well up to average for the time of the year. The spot market, however, was only moderately active. Encouraging reports are being received from the salesmen of the leading paper organizations. Prices are generally holding to schedule and shading is infrequent.

The situation of the news print market is practically unchanged. It is reported that the volume of newspaper advertising is decreasing slightly, although circulations are gradually expanding. Production is ahead of last year and consumption is about normal for the season. Prices are being maintained at recently recorded levels.

No radical changes were recorded in the paper board market. Production of box board is slightly ahead of the immediate demand and supplies are sufficient to take care of current needs. Prices remain steady. Some improvement was noticed in the request for fine papers and the market is in a strong position. The coarse paper market continues fairly active and wrapping paper is moving in excellent volume.

Mechanical Pulp

Most of the business transacted in the ground wood market during the week was along routine lines. Shipments against contract are still moving in satisfactory volume. The spot market is rather quiet at present but although offerings are ample, prices are being maintained at recent levels and there is not much talk of concessions around.

Chemical Pulp

Trading in the chemical pulp market was rather light, although inquiries were fairly numerous. Supplies are moving into consumption in a normal manner. Spot supplies of bleached sulphite are decidedly limited at present and this particular grade is in a very firm position. Prices of the various other grades are mostly steady and the undertone of the market is strong.

Old Rope and Bagging

Demand for both imported and domestic old rope is fairly persistent. Foreign manila rope is in somewhat improved request. Quotations are holding up to schedule without difficulty. The various grades of bagging are in moderate demand. Prices are being maintained at previously quoted levels, in most instances.

Rags

Mill interest in domestic and imported rags shows some signs of improvement. Roofing stock is becoming more active and cotton cuttings are moving in satisfactory volume. Quotations on domestic rags remain steady and practically unchanged. Foreign rag prices are still considered rather high, taking everything into consideration.

Waste Paper

The bright particular feature of the paper stock market is the continued demand for book stock. Supplies are rather scarce and prices for the different grades are firm. Old kraft machine compressed bales are still in excellent request. All the other grades of waste paper are in seasonal demand, with prices practically unaltered.

Twine

Steadiness prevails in the twine market, although trading is only moderately active. However, the consumption of wrapping paper shows no signs of falling off for some time, and this fact should benefit the twine industry materially. Prices of the various grades are holding up to schedule and the future outlook is promising.

Waste Paper Consumption

Waste paper comprises about 28 per cent of the raw materials consumed in the manufacture of paper, being second in importance to wood pulp, yet there are no reliable current statistics available as to the amount or value of the waste paper consumed by the paper industry in recent years.

The American Paper and Pulp Association plans to take a census of the waste paper situation and will make a direct canvass of the book paper, binders board and roofing felt mills. The Paperboard Industrial Association is cooperating in the move and will supply figures for the total waste consumed by the paperboard industry.

All individual mill reports will be kept in strict confidence and only a grand total of the value and tonnage for the entire country will be published.

The American Paper and Pulp Association believes that the non-member mills realize the value of such figures and will willingly cooperate.

Fewer Accidents at I. P. Mills

While there were two and one-half per cent more employees in the mills of International Paper Company during the first quarter of 1928 than during the corresponding period of 1927, there were twenty-seven per cent fewer lost time accidents.

The average number of days lost by employees through accidents, per 100 men employed, was twenty-five per cent less in the first three months of 1928 than during the corresponding quarter of 1927 and thirty-six per cent less than during the same three months of 1926.

Paper Industry's Tariff Protection

The American Paper and Pulp Association's general tariff committee, of which Milton E. Marcuse is chairman, has laid the ground work for effective presentation of the industry's tariff needs through request to the various organized and unorganized groups in the industry for appointment of committees to develop briefs covering their individual needs. Those briefs will then be harmonized by the association's tariff committee and the industry's united front presented at hearings before the congressional committees whenever such action is necessary.

How To Use Cost and Technical Departments

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., April 23, 1928.—The regular meeting of the Cost and Technical Association of the Paper Industry, Kalamazoo Valley division, was held Wednesday evening at the Columbia hotel. Grillet Collins, assistant general manager of the Bryant Paper Company, spoke on "How Managers Use the Cost and Technical Departments." Following the address there was a meeting on pulp testing.

For reliable running and average long life

LINDSAY FOURDRINIER WIRES

are unsurpassed

We make them for the largest and fastest machines.

Cylinder Wires All Sizes

The Lindsay Wire Weaving Co.

Collinwood Sta. CLEVELAND, OHIO

Prompt deliveries made from stocks in
NEW YORK
BOSTON
PHILADELPHIA
CHICAGO

TRADE U MARK

Yes Sir! They're real dyestuffs

Heller & Merz manufacture is concentrated upon one quality of dyestuffs—the best that large resources, skill and knowledge can produce. Our customers believe we are successful.

The proof is the fact that we have been supplying exacting users for nearly 60 years.

The HELLER & MERZ COMPANY
505 Hudson St., New York

Boston 287 Atlantic Ave. | Chicago 146 W. Kinzie St. | Philadelphia 114 Market St.

Springfield, Mass. 24 Lester Street

Factory—NEWARK, N. J.

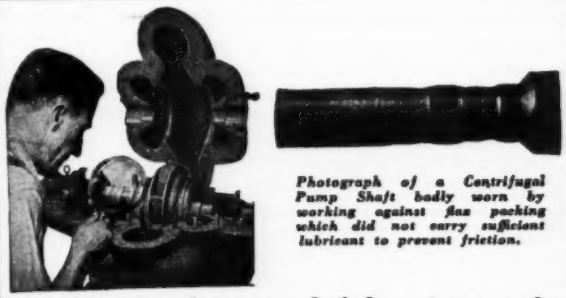
What the well groomed paper wears

"Flimsy" Sheet that's down at the heels, that's pale and spineless, needs to take stock.

He envies the popularity of his nearest neighbor—that paper that's always bright and lively, that's up-right and snappy. But "Flimsy" Sheet can stiffen his backbone, and make a good impression, too. The secret lies in his diet.

A few quarts of A-Syrup silicate in the beater give him a clear, bright look, smooth and unwrinkled — now they call him "Snappy" Sheet.

Philadelphia Quartz Company
Philadelphia, Pa.



Photograph of a Centrifugal Pump Shaft badly worn by working against flax packing which did not carry sufficient lubricant to prevent friction.

Avoid scoring the pump shaft by using a packing that has sufficient lubricant to prevent friction.

STYLE C PACKING

For pumps handling caustic soda and similar chemicals.

Its lubricant can be relied upon to resist the cutting action of these chemicals, and to keep the pump shaft so perfectly lubricated as to avoid friction.

To prove our claims let us send you a free working sample to test under your own conditions.

Specify Style C and state size desired.

GREENE, TWEED & CO.
Sole Manufacturers
109 Duane St., New York

Miscellaneous Markets

Office of THE PAPER TRADE JOURNAL,
Wednesday, May 2, 1928.

BLANC FIXE.—Conditions in the blanc fixe market are normal and the demand for both the pulp and the powder is fairly persistent. Prices remain unaltered. The pulp is selling at $60 per ton, in bulk, and the powder is quoted at from 4 cents to 4½ cents a pound, in barrels, at works.

BLEACHING POWDER.—Demand for bleaching powder was rather light during the week. Supplies are moving into consumption in a fairly satisfactory manner. Prices remain unaltered. Bleaching powder is offered at from $2 to $2.35 per 100 pounds, in large drums, at works, according to quantity and grade.

CASEIN.—Most of the business transacted in the casein market was along routine lines. The market was rather quiet and prices ruled weaker. Domestic casein is now quoted at from 15¾ cents to 17 cents a pound, while imported casein is selling at from 16¾ cents to 17 cents a pound, all in bags, car lot quantities.

CAUSTIC SODA.—Shipments of caustic soda are proceeding at an excellent pace. This product is in steady request and prices are holding to former levels. Solid caustic soda is offered at from $2.90 to $2.95 per 100 pounds. The flake and the ground are selling at from $3.30 to $3.35 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market is exhibiting a steady undertone. Contract shipments are moving in a regular manner. Prices remain unaltered. Imported china clay is quoted at from $15 to $25 a ton, in bulk, ship side. Domestic paper makers' clay is offered at from $8 to $9 a ton, at mine, and pulverized at from $10 to $12 a ton.

CHLORINE.—Steadiness continues to prevail in the chlorine market. Demand from the paper mills is persistent and supplies are going forward in good volume. Prices remain unchanged. Chlorine is selling at 3½ cents a pound, in tanks, or multi-unit cars, at works, on contract orders. The spot quotation ranges from 3¾ cents to 4 cents a pound.

ROSIN.—No radical changes were recorded in the rosin market. Most of the business transacted was routine and demand was rather light. Prices are somewhat weak at present. At the naval stores, the grades of gum rosin used in the paper mills are quoted at from $8.90 to $9.35 per 280 pounds, ex dock, in barrels. Wood rosin is now selling at from $7 to $7.80 per 280 pounds, southern shipping points.

SALT CAKE.—Consumption of salt cake is being maintained in excellent volume. Supplies are about sufficient to take care of the current demand. Prices remain steady and unchanged. Salt cake is offered at from $18 to $20 a ton, in bulk, at works. Chrome salt cake is quoted at from $14 to $15 a ton, in bulk, at works.

SODA ASH.—Contract withdrawals of soda ash are proceeding in heavy volume. Production is being maintained on a large scale but accumulations are not excessive due to offerings being freely absorbed. Prices remain unaltered. Contract quotations on soda ash, in car lots, at work, are as follows: in bags, $1.32½, and in barrels, $1.55.

STARCH.—Yet another advance has been announced by the starch refiners, due to the increasing costs of raw materials, and quotations are at the highest level recorded for some considerable time. Contract shipments are moving in a regular manner. The quotation on special paper making starch is now $4.12 per 100 pounds, in bags, and $4.29 per 100 pounds, in barrels.

SULPHATE OF ALUMINA.—The position of the sulphate of alumina market is practically unchanged. Demand for this chemical is moderately active at present and supplies are moving into consumption at a fairly satisfactory pace. Prices remain unaltered. Commercial grades of sulphate of alumina are selling at from $1.40 to $1.55 per 100 pounds. The iron free is quoted at from $1.90 to $2.05 per 100 pounds, in bags, at works.

SULPHUR.—Business in the sulphur market continues excellent. Demand is steady and the industry is in an exceptionally sound condition. Contract shipments are going forward in heavy volume. Prices rule steady to firm. Sulphur is quoted at from $18 to $19 a ton, in bulk, at mine, according to quantity.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	9.00	@45.00
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine Sized	8.00	@11.00
News—		
Rolls, contract	3.25	@ —
Rolls, transient	3.25	@ 3.50
Sheets	3.65	@ 3.85
Side Runs	3.00	@ 3.75
Book, Cased—		
S. & S. C.	6.35	@ 7.75
M. F.	6.25	@ 7.75
Coated and Enamel	8.00	@15.00
Lithograph	8.00	@15.00
Tissues—Per Ream—		
White No. 1	.75	@ 1.00
Anti-Tarnish	1.10	@ 1.90
Colored	1.00	@ 2.00
White No. 2	.75	@ .85
Kraft	.90	@ 1.00
Manila	.75	@ .85
Kraft—		
No. 1 Domestic	6.25	@ 6.50
No. 2 Domestic	4.50	@ 4.75
Southern	4.25	@ 4.50
Imported	6.50	@ 7.00
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.75	@ 5.25
No. 2 Wood	4.00	@ 4.50
Butchers	3.75	@ 4.25
Fibre Papers—		
No. 1 Fibre	5.00	@ 5.50
No. 2 Fibre	4.75	@ 5.25
Common Bogus	2.75	@ 3.00
Screenings	3.00	@ 3.25
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs.	13.00	@16.00
Bleached, basis 20 lbs.	15.00	@16.00

(Delivered New York)

Boards—per ton—		
News	45.00	@47.50
Straw	57.50	@60.00
Chip	42.50	@45.00
Binders' Boards	70.00	@75.00
Sgl. Mla. Ll. Chip.	55.00	@60.00
Wood Pulp	80.00	@85.00
Container	67.50	@72.50

Mechanical Pulp

(Ex-Dock)

No. 1 Imported—		
Moist	30.00	@31.25
Dry	32.00	@34.00

(F. o. b. Mill)

No. 1 Domestic	26.00	@29.00
Screenings	15.00	@20.00

Chemical Pulp

(Ex-Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	3.65	@ 4.25
Easy Bleaching	2.70	@ 2.90
No. 1 strong unbleached	2.60	@ 2.70
Mitscherlich unbleached	2.65	@ 3.25
No. 2 strong unbleached	2.50	@ 2.60
No. 1 Kraft	2.60	@ 2.75
No. 2 Kraft	2.40	@ 2.50
Sulphate—		
Bleached	3.75	@ 3.85

(F. o. b. Pulp Mill)

Sulphite (Domestic)—		
Bleached	3.40	@ 4.75
Easy Bleaching Sulphite	2.60	@ 2.75
News Sulphite	2.40	@ 2.65
Mitscherlich	3.00	@ 3.70
Kraft (Domestic)	2.70	@ 3.30
Soda Bleached	3.25	@ 3.50
Sulphate Screenings—		
Coarse	.75	@ .85
Refined	1.50	@ 1.65

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	11.75	@12.25
New White, No. 2	8.00	@ 8.50
Silesias No. 1	7.25	@ 7.75
New Unbleached	10.50	@11.00
Washables	4.25	@ 4.75
Fancy	5.50	@ 6.00
Blue Overall	6.75	@ 7.25
New Blue Prints	5.25	@ 5.50
New Soft Blacks	5.25	@ 5.75
Mixed Khaki Cuttings	4.75	@ 5.25
Pink Corset Cuttings	8.00	@ 8.50
O. D. Khaki Cuttings	5.25	@ 5.75
Men's Corduroy	3.75	@ 4.25
New Mixed Blacks	3.50	@ 3.75

Old Rags

White, No. 1—		
Repacked	5.50	@ 6.00
Miscellaneous	4.50	@ 5.00
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.50	@ 2.75
St. Soiled, White	2.00	@ 2.15
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.75	@ 2.00
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.70	@ 1.80
No. 1	1.70	@ 1.80
No. 2	1.50	@ 1.60
No. 3	1.30	@ 1.40
No. 4	1.25	@ 1.35
No. 5A	.95	@ 1.05

Foreign Rags

New Dark Cuttings	2.75	@ 3.25
New Mixed Cuttings	3.00	@ 3.50
Ord. Light Prints	2.25	@ 2.50
New Light Silesias	7.00	@ 7.50
Light Flannelettes	7.50	@ 8.00
Unbleached Cottons	10.00	@11.00
New White Cuttings	10.50	@11.50
New Light Oxfords	7.00	@ 7.50
New Light Prints	5.50	@ 6.50
No. 1 White Linens	7.25	@ 8.00
No. 2 White Linens	5.50	@ 6.25
No. 3 White Linens	4.50	@ 5.00
No. 4 White Linens	3.00	@ 3.50
Old Extra Light Prints	2.75	@ 3.25
Med. Light Prints	1.90	@ 2.10
Dutch Blue Cottons	2.25	@ 2.50
German Blue Linens	2.50	@ 2.75
German Blue Cottons	2.00	@ 2.25
Checks and Blues	1.75	@ 2.00
Lindsay Garments	1.85	@ 1.95
Dark Cottons	1.50	@ 1.60
Shoppery	1.45	@ 1.55
French Blues	2.25	@ 2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.65	@ 1.75
Domestic	1.70	@ 1.75
Wool Tares, light	1.60	@ 1.65
Wool Tares, heavy	1.60	@ 1.65
Bright Bagging	1.60	@ 1.65
Small Mixed Rope	1.25	@ 1.40
Manila Rope—		
Foreign	3.00	@ 3.10
Domestic	3.25	@ 4.00
New Burlap Cut	2.75	@ 3.00
Hessian Jute Threads—		
Foreign	3.50	@ 4.00
Domestic	3.25	@ 3.50

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, White, No. 1	3.25	@ 3.50
Hard, White, No. 2	2.75	@ 3.00
Soft, White, No. 1	2.60	@ 2.85
Flat Stock—		
Stitchless	1.85	@ 1.95
Overissue Mag.	1.90	@ 2.00
Solid Flat Book	1.75	@ 1.80
Crumpled No. 1	1.35	@ 1.45
Solid Book Ledger	2.00	@ 2.10
Ledger Stock	1.80	@ 1.90
Manilas—		
New B. B. Chips	.65	@ .75
New Env. Cut	2.40	@ 2.60
New Cuttings	1.60	@ 1.85
Extra No. 1 old	1.25	@ 1.35
Print	.75	@ .85
Container	.60	@ .70
Bogus Wrapper	.75	@ .85
Old Kraft Machine		
Compressed bales	1.90	@ 2.00
News—		
No. 1 White News	1.55	@ 1.65
Strictly Overissue	.80	@ .90
Strictly Folded	.65	@ .70
No. 1 Mixed Paper	.45	@ .50
Common paper	.30	@ .35

Clay

300 tons daily

AMERICAN MADE FOR AMERICAN TRADE

AT LAST!!

"An American Coating Clay"

H. T. Brand Coating Clay, Highest Grade Filler Clay, being used in some of the largest paper mills in the country. Send for samples and article on "*An American Coating Clay.*" Forty-three years experience in American washed clays are back of this product.

Let us submit sample and quote you.

EDGAR BROS. CO.
50 Church St.,
NEW YORK

The

ST. REGIS PAPER COMPANY

Daily Capacity
525 TONS

Newsprint
Catalog and Directory Papers
Fibre Wrapping Papers
Packers Oiled Manila
Specialties

General Sales Office

15 Broad St., New York

Farmers' Bank Bldg.
Pittsburgh, Pa.

"Ask Your Neighbor What He Thinks of Them"

109 JENSSEN

Two-Tower Acid Systems now in operation or building.

Jenssen Spray Type Cooler
Bullard Gas Washer
Decker Cooking Process
Kamyr Feltless Machines
Kamyr Pulp Presses
Strindlund Relief Cooler

G. D. Jenssen Company
200 5th Ave. New York, N. Y.

THE WATERBURY FELT CO.

Skaneateles Falls, N. Y.

FELTS AND JACKETS

Highest Quality—Prompt Service

Manufacturers of the
FAMOUS 5 X C JACKETS
FOR
FAST RUNNING MACHINES
They Satisfy!

SINCE 1887

Biggs Globe and Cylinder Rotary Bleaching Boilers have become known in every part of the world as standard paper-plant equipment. Repeated installations indicate very positively the complete satisfaction of our old customers.

THE BIGGS BOILER WORKS CO.
AKRON, 28, OHIO

Twines

(F. o. b. Mill)

Cotton—			
No. 1	.39	@	.40
No. 2	.37	@	.38
No. 3	.36	@	.37
B. C., 18 basis	.38	@	.40
A. B. Italian, 18 basis	.48	@	.53
Finished Jute—			
Dark 18 basis	.24	@	.25
Light 18 basis	.27	@	.28
Jute Wrapping, 3-6 Ply—			
No. 1	.21	@	.23
No. 2	.20	@	.22
Tube Rope—			
4-ply and larger	.18	@	.19
Fine Tube Yarn—			
5-ply and larger	.23	@	.27
4-ply	.24	@	.28
3-ply	.26	@	.30
Unfinished India—			
Basis	.16	@	.17
Paper Makers Twine			
Balls	.13	@	.15
Box Twine, 2-3 ply	.17	@	.19
Jute Rope	.21	@	.23
Ameri. Hemp, 6	.29	@	.31
Sisal Hay Rope—			
No. 1 Basis	.18	@	.20
No. 2 Basis	.16	@	.18
Sisal Lath Yarn—			
No. 1	.16	@	.18
No. 2	.14	@	.16
Manila Rope	.24	@	.26

CHICAGO

All Rag Bond	.35	@	.41
No. 1 Rag Bond	.25	@	.35
No. 2 Rag Bond	.14	@	.25
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine writing	.18	@	.24
No. 1 fine writing	.14	@	.18
No. 2 fine writing	.12	@	.14
No. 3 fine writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¾
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
News—Roll, mill	.03½	@	.04¼
News—Sheets, mill	.03¾	@	.04¾
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05½
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	.05¾	@	.06¼
Southern Kraft	.04½	@	.05
No. 2 Kraft	.05	@	.05¾
Wood Tag Boards	.04¼	@	.06½
Sulphite Screenings	.03	@	.03¾
Manila Tissue—			
24x36 Sheet	.07	@	.07¾
White Tissue—			
20x30 Sheet	.07¼	@	.07½
Boards, per ton— (Delivered Central Territory)			
Plain Chip	37.50	@	41.00
Solid News	47.50	@	—
Manila Lined Chip	55.00	@	—
Container Lined— (Delivered Central Territory)			
85 Test	65.00	@	70.00
100 Test	70.00	@	—

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.80	@	2.90
White Env. Cuttings	3.60	@	3.70
No. 1 Soft Shavings	2.50	@	2.60
No. 1 Mixed	1.00	@	1.05
No. 2 Mixed	.90	@	1.00
Ledger & Writings	1.55	@	1.65
Solid Books	1.20	@	1.30
Blanks	1.70	@	1.80
Krafts	1.90	@	2.00
New Kraft Cuts	2.25	@	2.35
Manila Envelope Cuttings	2.00	@	2.10
Ex. No. 1 Manila	1.55	@	1.65
Print Manila	.90	@	1.00
Folded News (overissue)	.65	@	.75
Old Newspapers—			
No. 1	.65	@	.75
No. 2	.60	@	.65
Mixed Papers—			
No. 1	.70	@	.80
Roofing Stocks— (F. o. b. Chicago, net cash)			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.07	@	.40
Ledgers	.11	@	.40
Writings—			
Superfine	.13	@	.18
Extra fine	—	@	.22
Fine	.20	@	.26½
Fine, No. 2	.16	@	.25
Fine, No. 3	.12	@	.20
Book, M. F.	.06	@	.07
Book, S. S. & C.	.06	@	.07½
Book, Coated	.11	@	.16
Coated Lithograph	.09	@	.12
Label	.09	@	.12
News	.03¾	@	.04
No. 1 Jute Manila	.08½	@	.09
Manila Sul., No. 1	.04½	@	.06
Manila, No. 2	.04	@	.04½
No. 2 Kraft	.05¼	@	.05½
No. 1 Kraft	.06	@	.06¼
Common Bogus	.02¾	@	—
Straw Board	60.00	@	65.00
News Board	47.50	@	50.00
Chip Board	42.50	@	45.00
Wood Pulp Board (Carload Lots)	4.50	@	5.00
Binder Boards—			
No. 1, per ton	80.00	@	90.00
No. 2, per ton	75.00	@	80.00
Carload lots	65.00	@	75.00
Tarred Felts—			
Regular	58.00	@	63.00
Slaters (per roll)	84	@	.94
Best Tarred, 1-ply (per roll)	1.85	@	1.95
Best Tarred, 2-ply (per roll)	1.44	@	1.54
Best Tarred, 3-ply	1.93	@	2.08
No. 1 Mixed Paper	.65	@	.70

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.11½	@	.12
New White, No. 2	.07	@	.07½
Light Silesias	.07	@	.07½
Silesias, No. 1	.07½	@	.08
Black Silesia, soft	.05	@	.05½
New Unbleached	.10½	@	.11
Washable	.04	@	.04½
Fancy	.05½	@	.06
Cottons—according to grades—			
Blue Overall	.07½	@	nt
New Blue	—	@	.04
New Black Soft	.05½	@	.06
New Light Seconds	.03	@	.03½
Khaki Cuttings	.04½	@	.05
Corduroy	03	@	.03¾
New Canvas	.08	@	.09½
New Black Mixed	.05	@	.05½

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.75	@	2.00
Manila Rope	3.00	@	3.50
Sisal Rope	1.50	@	—
Mixed Rope	1.10	@	1.25
Scrap Burlaps	1.40	@	1.50
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1, New Light Burlap	2.50	@	2.75
New Burlap Cuttings	—	@	2.50

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	3.25	@	3.35
No. 2 Hard White	3.00	@	3.25
No. 1 Soft White	2.50	@	2.75
No. 2 Soft White	1.90	@	2.00
No. 1 Mixed	1.50	@	1.60
No. 2 Mixed	.90	@	1.00
Solid Ledger Stock	2.00	@	2.10
Writing Paper	1.90	@	2.00
No. 1 Books, heavy	1.75	@	—
No. 2 Books, light	1.10	@	1.20
No. 1 New Manila	2.40	@	2.50
No. 1 Old Manila	1.50	@	1.60
Print Manila	1.00	@	1.10
Container Manila	.90	@	1.00
Old Kraft	2.25	@	2.50
Common Paper	.55	@	.60
No. 1 Mixed Paper	.60	@	.75
Straw Board, Chip	.65	@	.75
Binders Board, Chip	.65	@	.75
Overissue News	.80	@	.90
Old Newspaper	.60	@	.65

Domestic Rags (Old)

White, No. 1—			
Repacked	4.50	@	5.25
Miscellaneous	3.50	@	4.00
White, No. 2—			
Repacked	.02¼	@	.02¾
Miscellaneous	.02	@	.02¼
Thirds and Blues—			
Repacked	2.50	@	2.75
Miscellaneous	1.80	@	2.00
Black Stockings	3.75	@	4.00
Roofing Stock—			
No. 1	1.65	@	1.75

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.15
Rag content	.15	@	.30
All rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.07	@	.20
Superfines	.11	@	.31
News	.03½	@	.04
Book, Super	.06	@	.09
Book, M. F.	.05¾	@	.08½
Book, Coated	.08½	@	.20
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.05½	@	.06½
No. 2 Kraft	.04¼	@	.05
Common Bogus	.02¼	@	.02¾
Delivered New England points			
Straw Board, rolls .009			57.50
Straw Board in Sheets, basis 35s to 70s	54.50	@	55.00
Filled News Board			47.50
Chip Board			45.00
Single Manila Pulp lined board	55.00	@	60.00
Single White, patent coated board bender	72.50	@	80.00
Wood Pulp Board	80.00	@	85.00
Binder Boards	70.00	@	75.00
(F. o. b. Mill)			
Tarred Felts—			
Regular, carload lots	65.00	@	—

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.10
No. 2 Hard White	2.60	@	2.90
No. 1 Soft White	2.60	@	—
No. 1 Mixed	1.10	@	1.15
No. 2 Mixed	.85	@	.90
Solid Ledger Stock	2.50	@	—
No. 1 Books, Heavy	2.00	@	—
No. 1 Books, Light	—	@	1.15
Manila Env. Cuttings	2.00	@	2.25
No. 1 Old Manila	1.20	@	1.25
White Blank News	1.40	@	1.50
Old Kraft	1.90	@	2.00
Print Manila	.70	@	.80
No. 1 Mixed Paper	.45	@	.50
Overissue News	.70	@	.80
Old Newspapers	.50	@	.60
Box Board, Chip	.65	@	—

Bagging

(Price f. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.75
Domestic	1.55	@	1.60
Manila Rope—			
Foreign	2.80	@	3.00
Domestic	—	@	3.00
Mixed Strings	.95	@	1.00
Scrap Burlaps	1.25	@	1.30
Wool Tares, heavy	1.35	@	1.50
New Burlap Cutting	—	@	2.00

Domestic Rags (New)

(Price f. o. b. Boston)

Shirt Cuttings—			
New White No. 1	.11	@	.11½
Silesias, No. 1	.07	@	.07¼
New Unbleached	.09½	@	.10
Fancy	.05	@	.05½
Washable	.04	@	.04½
Cottons—According to grades			
Blue Overalls	.07	@	.07½
New Black, soft	.04	@	.04½
Khaki Cuttings	.04¼	@	.05
Corduroy	.03	@	.03¼
New Canvas	.08	@	.08½

Domestic Rags (Old)

(Price f. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	5.50	@	5.75
Miscellaneous	5.00	@	—
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Thirds and Blues—			
Repacked	2.00	@	2.12½
Miscellaneous	1.75	@	1.90
Roofing Stock—			
No. 1	1.70	@	—
No. 2	1.50	@	—
No. 3	1.10	@	—
No. 4	1.10	@	—

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.55	@	1.65
New No. 1 Shirt Cuttings	10.50	@	11.00
Dutch Blues	2.00	@	2.12½
Lace Curtains	5.00	@	5.25
New Checks & Blues	4.50	@	4.65
Old Fustians	1.90	@	—
No. 2	1.40	@	1.50
No. 3	1.25	@	—
No. 4	1.10	@	1.20
No. 5A	.85	@	.90
"	.80	@	—
C	.70	@	.80

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.12½	@	—
No. 2 Sulphite	.10¾	@	—
No. 1 Colored	.13½	@	—
No. 2 Colored	.11¼	@	—
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
News f. o. b. Mills—			
Rolls (carloads)	3.25	@	—
Sheets (carloads)	3.75	@	—
Sheets (2 tons or over)	4.00	@	—
Book—			
No. 1 M. F. (carloads)	7.75	@	—
No. 2 M. F. (carloads)	7.50	@	—
No. 3 M. F. (carloads)	7.25	@	—
No. 1 S. C. (carloads)	8.25	@	—
No. 2 S. C. (carloads)	8.00	@	—
No. 3 S. C. (carloads)	7.75	@	—
No. 1 Coated and Litho	14.50	@	—
No. 2 Coated and Litho	13.50	@	—
No. 3 Coated and Litho	12.75	@	—
Coated tinted	.15	@	—
Wrapping—			
Rag Brown	4.85	@	—
White Rag	5.25	@	—
"B" Manila	5.65	@	—
No. 1 Manila	6.65	@	—
Fiber	6.65	@	—
Kraft, M. F.	7.20	@	—
M. G.	7.35	@	—

Pulp

(F. o. b. Mill)

Ground Wood	27.00	@	28.00
Sulphite easy bleaching	60.00	@	—
Sulphite news grade	50.00	@	52.50
Sulphite, bleached	68.00	@	70.00
Sulphate	65.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	3.00	@	—
Soft White Book Shavings	2.85	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.25	@	—
Light and Crumpled Book Stock	1.10	@	—
Ledgers and Writings	1.50	@	—
Solid Ledgers	1.50	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	1.00	@	—
Kraft	2.25	@	—
News and Scrap—			
Strictly Overissue	.80	@	—
Strictly Folded	.80	@	—
No. 1 Mixed Paper	.65	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.12	@	.12½
Fancy Shirt Cuttings	.06	@	.06½